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Standardization and Freedom for Experiment*

WILLIAM LOWE BRYAN
President Indiana University

At the inauguration of President Lowell some years ago, I heard President Eliot say that when he was inaugurated in 1869 any one who chose could come in off the street and enter the Harvard School of Medicine. In 1927, 4,500 men, all of them with four years of high school work and at least two years of college work were unable to obtain admission to any school of medicine in the United States, and most of those who did enter were subject to the prescription of exactly so many clock hours in so many calendar years in exactly such and such subjects. That is to say, in about fifty years we have passed from extreme license in medical education to the extreme of social control.

When the history of that revolutionary transformation is written with a complete showing of the successive resolutions, rules and statutes through which it has come, it will be a vitally important chapter in the history of the United States. I dare go further and say that it will be an important chapter in the history of modern civilization. For the swing in medical education is not isolated from the rest of what is happening in our society. It is undoubtedly part of the great swing in society as a whole.

Trend of Medical Education

I wish to look at what has happened in our medical education since Mr. Eliot became president of Harvard University in the light of what has happened since Columbus discovered America. Discerning historians tell us that there are great secular movements of civilized society at one time toward close social control, at another, toward unrestricted individual freedom. The main movement of our society (of course, not the whole movement) within the past five hundred years has very obviously been away from social agreement and social control toward wide and wider disagreement and wide and wider liberty for the individual.

*Address delivered at the Thirty-ninth Annual Meeting of the Association held in Indianapolis, October 29-31, 1928.

When Columbus sailed, he left a Western Europe in the grip of a social consensus. One church. One theory of government, namely the divine right of the autocratic King. One theory of education based on the church's theory of what life is for. One industrial system. There was always, of course, some latent and some open rebellion, but, generally, at serious peril for the rebel. One does not need to be a historian to see the resistless movement of society since 1492 away from all that toward freedom from all that. No church dominates. No King is left to claim divine right or autocratic power. There is no general agreement as to what a man is for, what life is for or toward what end the children of men should be educated.

Freedom from Restriction

What has caused this resistless movement away from general agreement toward wider and wider disagreement, away from every kind of restriction toward every kind of freedom from restriction? It is for the historians to grapple with that question, but I believe they will agree that one potent cause of this profound revolution has been the discovery and settlement of America. For, the Europeans who came here and scattered sparsely through the American wilderness became inevitably a law unto themselves. The farther they scattered, the more they became individualistic. Students of the American pioneer, Professor Turner, Roosevelt, Beveridge and others have exhibited at large the evidence of his fighting individualism. Senator Beveridge, in his masterly Life of John Marshall, gives the evidence that when our Constitution of 1788 was made and adopted, a large proportion of our people, especially in the outlying settlements, did not want any Constitution at all. Senator Beveridge says: One idea and one alone possessed this type—the idea of independence, freedom from restraint. He was high priest of the religion of do-as-you-like. He was the supreme individualist. The ultimate democrat. He will not consent, says De Warville, to sacrifice a single natural right for all the benefits of government. How the ideal and achievement of the American pioneer has reacted upon Europe is another major problem for the historian.

Social Coercion

What I wish to note is that the pendulum begins to swing the other way in America. The American pioneer in the wilderness whose nearest neighbor was far away was free to practice at will his religion of do-as-you-please. With a hundred million neighbors, of whom twenty million have automobiles, the religion of do-as-you-please is barred. First slowly and then always more rapidly as population has thickened, we have been dragged unwillingly, inch by inch, decade by decade, away from the freedom of the pioneer into more and more social coercion which none can escape. The most defiant pioneer must obey the traffic

cop, must obey the dairy inspector, must obey the health officer, or whatever officer speaking for society tells him to "stop" or "go" as the general social welfare requires.

Educational Standardization

The history of educational standardization is one small but vitally important part of the swing of society toward closer social control. Consider, for illustration, our public schools. A hundred years ago, in most parts of the West, you could teach in a public school if a school officer, who might himself be unable to read and write, thought you could whip the biggest boy in the district. Twenty-five years ago, when some of you taught in the common school or high school, you had to pass an examination, but then had lawful authority to teach any and all subjects whether you knew anything about them or not. In my own case, within a few years of such experience, I taught all the common school subjects and also history, physical geography, algebra, Latin, botany and astronomy. Whatever good or evil there was in all that is now gone with the snows of yester year. Our present teacher training law in Indiana (very much like such laws in the other states) is so elaborate and complicated that I believe not above twenty people in this state can tell a prospective teacher exactly what he must do to qualify for the license he wants. And when the youth has followed in the straight and narrow path prescribed, he then has authority of law to teach that and nothing else. One who at much cost of time and money has gained the right to teach algebra in the high school, must spend more time and money before he is allowed to teach algebra in the junior high school, and still more time and money before he is allowed to teach anything else in any public school anywhere. The public school teacher must get and then be able to hold one certain kind of job. If he cannot do that he is out. He must then leave his profession and look for a living in some other way.

I fear that our teacher training laws are steering tens of thousands of young people into this economic trap. I have seen a musician of distinguished ability turned away from an Indiana high school, whose superintendent and trustees wished to employ him because, although a former student of Cornell and of Leipsic, he did not meet the requirement of our statute that he be a graduate of a commissioned high school. And I hear that the notable physicist and Nobel prize winner, Professor Millikan, has said that he could not qualify to teach physics in a California high school.

In the case of the colleges and professional schools the best general study so far as I know is that of President Kelley of the University of Idaho. Dr. Kelley, formerly a dean of the University of Minnesota, was requested by the Association of State Universities to make this study. He submitted reports at two meetings of the Association. The re-

ports show with what rapidity and with what irresistible force we have moved away from the liberty of 1869 to the coercive standardization of 1928. The standardizing bodies with or without legal authority make prescriptions and then they make lists, white and black. To be on the more potent black list means for any school simply death.

Medical Education

An extreme illustration of this as you know is to be found in the history of medical education within the past twenty-five years. Something more than twenty-five years ago you saw the glaring evils in medical education as it then was. You saw scores of fraudulent schools and other scores of schools unforgivably weak and unable to give proper training for medical practice. You saw the central duty of bringing medical science at its best to the people through rightly trained physicians. You went to war. You inspected schools with relentless thoroughness. You published the worst you found there without mercy. You agreed upon ironclad prescriptions. And then you made lists. The lists did the work. Your black list killed the weak and the fraudulent schools by the score. Within an astonishingly short time you have wrought a revolution in medical education in Amercia, great and, as we believe, necessary and inevitable.

Freedom of Experiment

But now that you have won your war you have begun to think of something else. You discover that most of the other schools of the university have a freedom to experiment which you need and must recover. The colleges of arts and sciences though citadels of educational conservation are making daring experiments all across the land with none to forbid not even Phi Beta Kappa or the American Association of University Women. In many colleges the student reading for honors is now completely free from the teeth of the collegiate machine. He is free of all rules except the one we have always had at Indiana University that no student shall shoot a professor. There are schools of engineering that have turned away from the usual engineering curriculum which is given over largely to shop practice with current machines and processes and have adopted a far different curriculum given over chiefly to the underlying sciences. They can do that without fear of the state licensing boards.

The schools of medicine are only now recovering the liberty to make such experiments. You are imprisoned by the rules which you have yourselves written into coercive laws. For five and twenty years you have fought to establish these laws. You are now beginning to fight for the recovery of necessary freedom from them.

I excuse myself for speaking to you who are experts in medicine because I also in this and in some neighboring fields have had to be

in the thick of the fighting. I have tried to see what we are fighting toward. I have seemed to see our earlier American history in all its varied chapters as part of the world movement through recent centuries toward the utmost freedom for every individual—such freedom as Daniel Boone went farther and farther into the wilderness to get and keep. I have seemed to see our late and especially our latest American history as a rapid and irresistible movement toward more and more social control. Does this sound abstract and remote? Here, then, is something which is neither:

The freedom of our wilderness pioneer is gone!

Across the path of every man are the traffic cop, the health officer and the rest of the police. What is infinitely more important, across the path of the youth are the schools and licensing boards which allow him or forbid him to make his living at his chosen profession. The schools and the licensing boards are here to stay. But they must not stay still. Like every human institution they grow stiff, moribund and presently the enemies of the human needs which gave them birth. As in the case of every human institution, our task and if necessary our fight is to keep the school and all standardizing agencies in continuous living adaptation to the needs of men.

Coordination in the Teaching of the Fundamental and the Clinical Sciences*

A. D. HIRSCHFELDER

Professor of Pharmacology, University of Minnesota

You will agree with me that the great difference between the medical man of today and the good old country doctor of the age of pills and saddlebags lies in the fact that the modern physician has and demands a clear idea of the reasons for the things that he is doing, while the old-time doctor did them only because he heard that they were once done successfully by somebody else, without knowing the reasons why.

Much of this modern understanding is based on the firm ground of pathological anatomy and bacteriology. It is easy for men to understand what they can see, and to remember and use what they have seen; and because of the definiteness of this visible evidence, it is easy for physicians and medical students to translate the evidence of pathological specimens, bacteriological cultures and serological reactions, into the facts of accurate diagnosis. But a great part of medicine today, in both diagnosis and treatment, is based on the facts of chemistry and physiology, and these seem to be much harder for the physician and the medical student to understand thoroughly, to make part of his mental being and to translate into the understanding and the treatment of his patient.

Theory versus Practice

In the medical student of today, this is not due to an inadequate preliminary training. He has had a thorough course in general chemistry, organic chemistry and physical chemistry. He has performed the fundamental experiments with his own hands. He has done the same in the laboratory of physiological chemistry and of physiology. The theoretical aspects have been well covered in lectures, quizzes and examinations. But, he usually has taken these subjects as the necessary evils of a long curriculum, and by the time he enters his clinical years, they have been shed from his cortex like water from a duck's back. He has not learned to correlate them with the facts of the bedside. His teachers of chemistry and physiology have not intimated their practical usefulness. His own mind is not yet provided with facts to reveal this to him. They have seemed, while he was taking them, to be useless prerequisites—and it is only rarely that his clinical instructors have revived them with a definiteness sufficient to

*Read at the Thirty-ninth Annual Meeting of the Association held in Indianapolis, October 29-31, 1928.

bring back the hazy recollections of early training—or to lead the upper classmen to remind the lower classmen that these are facts that will be useful, and are worth knowing. The more a student finds that things which appear purely theoretical have practical application, the more he is tempted to become interested in the theoretic; the more he is tempted to look for new applications whether they have been told to him or not.

Faults of Teaching Methods

In the last analysis, we teachers of the fundamental sciences may very correctly take refuge in the fact that if the clinical teachers did their duty in bringing out the important rôle that chemistry, physiology and pharmacology play in the understanding and treatment of patients, this conception would soon filter down to the lower classes and to the premedical students, and many of our difficulties in teaching, even without any alteration in teaching methods, would spontaneously disappear. Our tendency is certainly to take refuge behind the classic answer of Pasteur, who, when asked what was the use of his theories of the bacterial origin of disease, answered, "What is the use of a new-born babe?" And yet one might very well wonder what would become of the new-born babe if he were kept hidden away from the sunlight in the unused garret of a cerebrum, never nourished with the food of interest or the vitamins of enthusiasm, and never trotted out for exercise by a fond, enthusiastic parent. Are we letting our new-born babes of theoretical instruction die of inanition, or at best become very puny, rachitic children, even though with proper hygiene and nourishment we could have raised them to robust athletes? And so, when two recent presidents of the American Medical Association in their presidential addresses have felt compelled to arraign the present-day methods of teaching the fundamental sciences, I think it is incumbent on those of us who are attempting to teach these branches, to take stock of our teaching methods and results, and to see whether we are doing our full duty and whether we can do anything further to achieve the best results.

Emphasizing the Fundamentals

I wish to say, at the outset, that I believe we can do a great deal more than is usually done; and, on the other hand, I want to state emphatically that I do not believe that the remedy lies in abolishing the non-medical professor or in diminishing, in the least, the training in the fundamental aspects of the subjects. Quite the reverse; I believe to the very fullest in emphasizing the fundamentals in every way possible, and in stimulating research among professors and even undergraduate students; but I do believe that the solution of our main difficulties lies in encouraging and in insisting on continuous correlation of the fundamentals with the practical application. And today, I would

like to bring before you some of the methods which I have used at the University of Minnesota to bring about this result, and which I have found by experience actually do so to a considerable degree.

Correlation of Fundamentals with Practical Application

The first method is that of one or more lectures giving a bird's-eye view of the specific applications to the practice of medicine of things which are embraced in the work of the course. This has been tried with some success in connection with the course in general chemistry given to the premedical students at the University of Minnesota. For several years, I have given one lecture to each class of university freshmen, sketching some of the uses to which they will put their chemical facts during their careers as students and practitioners of medicine, showing them how simple substances like the salts of sodium, potassium and calcium regulate the beat of the heart and the life of the tissues; how magnesium salts act as anesthetics, and how the salts of the heavy metals act as antiseptics and as industrial poisons; how respiration is regulated by the carbonate and bicarbonate of sodium, and the variations in hydrogen ions; how substances like aniline, benzyl alcohol and chloral, which they synthesize in the organic laboratory, play important rôles in the synthesis of modern drugs—and how the diagnosis and prognosis of gastric and renal disease often depends on accurate methods of quantitative analysis of stomach contents and blood. These represent just a few of the applications which are touched on.[1]

Even one lecture of this kind helps to show the beginner something of the use that he will make of the subject. Much better it would be to devote one lecture to the applications of general chemistry, another during the courses in qualitative and quantitative analysis to the applications of that work and a third to the applications of organic chemistry to medicine.

Methods of Correlation

These foreshadowing lectures have a field of usefulness; but we have found that much more effectual than lectures, is a series of questions introduced into the laboratory notes, to be answered, as problems in applied pharmacology, by the students themselves; questions framed in such a way that the answer follows readily from the things that the student has already observed in the laboratory. I began using this method about ten years ago after finding that students found great difficulty in applying the findings of experiments and demonstrations performed in the laboratory to the understanding of similar conditions which they encountered in their patients. And I may say that since doing so, we have found them much better able to bridge this gap.

1. Hirschfelder, A. D.: The Direct Applications of Chemistry in the Study and Practice of Medicine. *Jour. Chem. Ed.*, 1925, II, 431.

Since these are second year medical students who have not yet seen patients, the questions are made as simple as possible and the descriptions of clinical conditions are made in terms of simple pathology and physiology, so that the answers follow almost axiomatically from the experiments which they have performed.

Specific Type of Experiments

For example: I. The students have precipitated bichloride of mercury by adding some egg white, and have found that the mercury, though precipitated, is still in the toxic bivalent form. They have also precipitated the bichloride by the addition of sodium thiosulphate and have found that in this case the mercury is reduced to the non-toxic monovalent form.

QUESTIONS: 1. Considering the chemical reactions, which would be more effective, precipitation of bichloride with protein or precipitation with sodium thiosulphate?

2. If you were called up by phone and told that a person had taken a tablet of $HgCl_2$ (usually 0.5 Gm.) what would you order the family to do at once?

3. What would you do when you arrived at the house?

4. Considering the chemical reactions, what would be the best procedure for furnishing an immediate antidote for bichloride of mercury?

II. The students have had a demonstration showing the production of constriction of the guinea pig's bronchi and the relief of the constriction by atropine and epinephrine. They have also studied the composition and mode of inhalation of the typical asthma powders.

QUESTIONS: 1. What drugs might be used for the relief of an attack of broncho-constriction (bronchial asthma) in man? Give doses.

2. Considering the size of its action, which of these drugs would you expect to be most effective in asthma due to direct stimulation of the bronchial muscle, as in hay fever or chronic bronchitis?

III. They have watched the increased peristalsis in the rabbit's intestine induced by injections of physostigmin and of pituitrin.

QUESTION: What drugs could you administer to cause increased peristalsis and passage of gas in a postoperative patient who suffers pain from distention of the bowel with gas?

IV. They have themselves synthesized methenamina from formaldehyde and ammonia in alkaline solution. They have split it into its components by acidification and have taken the drug by mouth and collected and incubated their urine, and found that it remained sterile if the urine was acid.

QUESTIONS: 1. A patient has a cystitis with bacteria present in an alkaline urine. If the antiseptic action of methenamina depended upon the splitting off of formaldehyde, would methenamina be indicated in this case?

2. What further steps would be necessary in order to render it useful?

3. A patient has meningitis and methenamina has been prescribed. What results may be expected?

4. Would a synthetic substance which is capable of splitting off formaldehyde in alkaline solution (as is the case with "novaspirin" and some other drugs) act as an antiseptic in alkaline urine or in other body fluids?

V. The students have witnessed a demonstration of the production of tricuspid regurgitation in the excised dog's heart by overdilating the right ventricle, and they have been shown the diminution of the leakage when the tricuspid orifice is narrowed by producing heat rigor in the ring of muscle that encircles the tricuspid orifice.

QUESTIONS: 1. In a case of mitral insufficiency in which there are both vegetations on the mitral valve and a flabby, weakened heart muscle, which factor would probably be responsible for the greatest number of cubic centimeters of leakage into the auricle?

2. What would be the effect on the leakage of increasing the strength and tonus of the heart muscles?

3. What would be the effect of administering digitalis in such a case?

4. What effect would you expect in the treatment of aortic regurgitation? In considering this, bear in mind that in this case blood leaks back into the left ventricle during diastole until the walls of the ventricle are stretched to the point that the force stretching them (the diastolic pressure) is just balanced by the force resisting distention (the tonus of the heart walls).

5. Would the leakage and distention be greater with a high or low tonus?

6. Would the administration of digitalis increase or decrease cardiac tonus?

7. Would the administration of digitalis be advisable or inadvisable for the treatment of aortic regurgitation?

VI. They have looked at the exposed heart in the dog's thorax, have watched me constrict the aorta with a sliding ligature until a thrill, a pulsus tardus and a fall in blood pressure have set in and the ventricles have dilated visibly. They have seen digitalis administered, the heart beat grow more forcible, the blood pressure rise, the pulsus tardus disappear and the heart grow smaller in spite of the fact that the tightness of the ligature has not been altered, the stenosis of the aorta has remained and the systolic murmur has persisted.

QUESTIONS: 1. What is the effect of digitalis upon the strength of the heart in aortic stenosis?

2. How does this affect the dilation of the heart?

3. How does it alter the form of the pulse?

4. What does this show as regards the significance of the pulsus tardus? Does the presence of a pulsus tardus indicate aortic stenosis or only that the aortic stenosis is in the stage of decomposition?

5. Could you have an aortic stenosis with a systolic murmur but without the presence of a pulsus tardus?

6. Should digitalis be given to a patient with compensated aortic stenosis?

Value of Questionnaire Method

Our questionnaire system we use also in the purely chemical experiments. In fact, in every way we try to scramble the fundamental theories in with the clinical experiments so that they shall be indissociable in the minds of the students.

Thus, on the same day that they study the physical chemistry of the two types of emulsions—the oil in water and the water in oil, they study the effect of the emulsification of castor oil in producing a tasteless preparation.

This questionnaire method foreshadowing clinical applications is particularly useful in the teaching of pharmacology which is closely related to clinical medicine, but it would also be useful in physiology, physiological chemistry, anatomy, neurology and embryology.

Correlation of Embryology

Most medical students regard embryology as one of the least useful of the subjects in the curriculum, and yet it also can be correlated closely with clinical practice.

For example, when one encounters a patient with a congenital heart lesion, the lesion rarely is a single one and presents a rather confusing picture of multiple lesions, but how simple it becomes if the student has been asked in his embryology, "What would result if in a late embryo the pulmonary orifice should become narrowed by scar tissue resulting from an infection along the pulmonary artery?" Obviously, the right ventricle could not force out the blood, the blood would remain dammed back, would over-fill, the interventricular septum would be kept open and would not close, the right auricle would over-fill and the foramen ovale would be kept open so that the child would develop the triple lesions—pulmonary stenosis, open interventricular septum and open foramen ovale—the conditions which are most usually met with when a child has congenital heart lesions.

Understanding Referred Pains

Every clinician has found that the distribution of the referred pains of visceral disease are puzzling. One often encounters stiff neck in tonsillitis or pain in the shoulder from diaphragmatic pleurisy, and one cannot fail to be impressed by the strangeness of the pains down the arm in angina pectoris, and the pain in the umbilical region on the first day of appendicitis. But if we consider the anatomy of a month old embryo when the tonsils are still the gill slits supplied by nerves which anastomose with branches of the eleventh cranial nerve; when the heart and the diaphragm are still at the level of the neck, and supplied by the same segments that send branches to the arm and to the shoulder; and when the small intestine and the appendix are still out in the umbilical stalk and are supplied by the same nerve segments

that supply the umbilicus; and ask the question: "If a month old embryo felt the pains that arise in internal organs and referred them to the corresponding regions of the skin, where would the pain arising in each area be referred?", the answer would show tonsillar pains might be referred to the ear or to the neck, cardiac pains down the arm, diaphragmatic pains to the shoulder, pains from the small intestine and the appendix to the umbilical region—in short, as far as visceral disease is concerned, we feel our referred pains as though we were still one month old embryos.

And so for the practitioner of medicine the anatomy of the early embryo gives the shortest cut to understanding some of the mysteries of medicine.

These represent a few examples of the correlations that can be brought out between the so-called fundamental sciences and their applications to clinical problems.

The Non-Clinical Teacher

It might be objected that these correlations would suggest themselves only to an instructor who has himself served a considerable apprenticeship in clinical medicine; and some might construe this as an argument against non-clinical teachers. This is by no means correct. Each of us has his own ideas of the importance of the things which he desires to include in his own course, and rightly so, for it represents the best individuality of the teacher. But those fundamental teachers who have not had clinical experience could profitably spend an evening going over the material of their course with some clinical friend, who would gladly supply these clinical applications from his own experience and these could easily be translated into a series of questions, so that the student would thus introduce himself to the far-reaching significance of what he has seen with his frog's leg or in his test-tube. And he would be led gradually into that most valuable of habits, of regarding his patient in terms of living physiology and of vitalized chemistry; and of regarding those subjects as necessary aids for the understanding of his patient.

Experiments in Correlating Clinical, Laboratory and Didactic Instruction in Psychiatry and Therapeutics*

H. R. WAHL
Dean, University of Kansas School of Medicine

The highly complex character of modern civilization and its tendency to place a constant strain on the nervous system has developed an increasing number of mental and nervous disorders and made imperative the recognition of incipient mental disorders by all practitioners, if more permanent mental injury is to be avoided. Hence, every medical student should have the opportunity of studying patients having the more common mental disorders and should learn to distinguish them from the various neuroses, psychoses and other functional disturbances.

It is difficult to get the students' interest in this field, especially if the available clinical material is scanty and atypical. It occurred to several members of the faculty of the University of Kansas School of Medicine that if each student would be afforded a short intensive experience with large numbers of patients illustrating well defined mental types, such as would be obtained by residence in an institution set aside for the care of such patients, he would gain a better understanding of the lectures and clinics in psychiatry and take more interest in them.

Teaching in Mental Hospitals

During the past two years we have sent each senior medical student for two weeks to one of the modernly-equipped state institutions containing from 1,500 to 2,000 inmates in various stages of mental disease. Each of these hospitals is in charge of a trained and experienced psychiatrist who is, fortunately, also an excellent teacher, enthusiastic of his specialty and keenly interested in stimulating the students' interest in his specialty.

Each student serves as a clinical clerk in the hospital, which gives him his lodging in return for the services that he renders. He accompanies the head of the institution on his ward rounds each morning. He is assigned a selected number of cases and is required to study one case thoroughly and report it at the weekly conference of the hospital staff. He is required to submit a copy of this report to the dean's office on his return. The student is made familiar with special methods of examining mental patients. The students also has the opportunity of observing many other medical and surgical conditions that naturally occur in a population of 2,000 and noting how they may be modified in abnormal mental conditions.

*Read at the Thirty-ninth Annual Meeting of the Association held in Indianapolis, October 29-31, 1928.

Results

The results were most satisfactory. The students invariably returned enthusiastic about their experiences at these institutions. They acquired a new interest in psychiatry and a much clearer conception of mental disorders. Many expressed surprise at the intelligent way in which the mental patients were treated and even marveled at the apparent lack of restraint of most of the patients. They received a profound impression of the modern treatment of the mentally deficient. They had an excellent opportunity to study abnormal psychology. They acquired experience in the methods of studying and managing mental states. They also had a chance of witnessing the relation of these institutions to the profession of the state.

The most outstanding effect of this experiment was the eagerness and better understanding of the students in all clinics and discussions involving mental disorders. This naturally proved particularly gratifying to the instructors in both neurology and psychiatry.

Correlation of Pharmacology and Therapeutics

The second experiment is one involving the correlation of pharmacology and therapeutics. The latter is difficult to teach, largely because there is such a divergence of opinion, even among most successful practitioners, as to the relative value of various drugs and therapeutic measures in use. This is particularly true in the outpatient department, where there is often a striking contrast between the careful, scientific, even painstaking care in application of therapeutic measures in one clinic and the loose haphazard method of another clinic. This conflict is bad for the patient. It is disconcerting to the student to be told one thing by one instructor and the opposite by another. Most of the clinics make little effort to point out to the student the relation of his pharmacologic training to its therapeutic application in these outpatient clinics.

In order to bring order out of this chaos; to show the students the value of his scientific work in pharmacology in the treatment of patients in the outpatient clinics, and to systematize the treatment work of the dispensary, a new organization was developed eighteen months ago.

Special Treatment Clinic

Whenever the treatment of a patient involved some special mode of administration, such as intramuscular or intravenous injection, the patient is referred to the "special treatment" clinic with a specific statement by the referring physician as to the type, dosage and character of treatment desired. The clinical record is sent to this clinic with the patient. These instructions are followed, and, when completed, a note of this is placed on a special blank and appended to the

record, and the patient is returned to the first department for further observation or discharge. Occasionally, no instruction for the treatment is given, in which case the physician in charge of this clinic uses his own judgment.

Personnel of Clinic

The professor of pharmacology of the School of Medicine is in charge of this "treatment clinic." He has another physician as his assistant, a nurse and two technicians. Six students are assigned to this clinic for a period of six weeks and carry out the actual administration of most of the treatments under the direct supervision of the pharmacologist and his assistant. From 40 to 50 patients are treated here each day. In the course of the clinic, the instructor discusses the various procedures, points out items of special interest, gives the indications and contraindications for certain procedures, and constantly emphasizes precautions that are needed in the dosage and preparation of intravenous and intramuscular injections.

Results

The results after more than eighteen months trial are interesting and suggestive. It will require more time before we can say that the experiment is a complete success. The patient undoubtedly receives much better treatment and gets full benefit of consistent scientific treatment. This is especially true of those patients who have individual peculiarities that require modification of the usual administration, or of those who require a graduated series of treatments such as is recommended in some forms of lues and in ovarian disturbances. The occurrence of untoward reactions following injections is now rare, whereas they were too frequent before this experiment was developed. Moreover, there is no chance of the patient being overlooked or neglected under this system.

The outpatient department is benefited by the time it saves the nurses and the avoidance of unnecessary duplication of instruments, sterile supplies, etc., that the old plan entailed. The clinical attendants in all departments are enthusiastic about this plan. It relieves them of the burden of routine treatment in which many are not interested.

Value to Pharmacology

The experiment has been of particular interest to the pharmacologist. He has here an excellent opportunity of comparing the response of patients to drugs that he is accustomed to administer to animals, and he notes the differences that occur. Our instructor was at first skeptical of the value of intravenous and intramuscular indication in contrast to the oral route, but was soon convinced of the superiority of the former, especially with antirheumatic drugs. Furthermore, he has an excellent opportunity to try out the effect of various

dosages and various modes of administration in different diseases. He has, as a result of this direct contact with patients, acquired much more sympathy with the problems of the clinic. He has an opportunity to study human nature and often applies nonmedical therapy with gratifying results. As a result of this work, the pharmacologist has a better understanding of the points that should be emphasized to the students. At the same time, he can determine quickly how successfully his teaching has prepared the student when faced with the problem of actually administering the drugs to clinical cases.

Effect on Students

Probably the most promising results of this experiment are those that affect the students in these clinics. The student has the opportunity to carry out the medication himself directly under the supervision of an instructor who stands ready to check up any break in technic. He acquires practice in various modes of administering drugs and in their preparation. He is constantly shown the value of the scientific attitude in this work. He is encouraged to ask questions. He is taught how to manage different types of patients. He has the opportunity of seeing the variation in effect of the same drug or the same administration on different individuals. The student also soon realizes what is meant by rational therapy and can correlate his work in the pharmacologic laboratory with that in the treatment clinic. He acquires more respect for the pharmacologist and at the same time understands the antagonism that occasionally exists between the busy clinician and the pharmacologist, whose experience is often limited to the effect of drugs as he notes them on animals. Furthermore, when the student administers the treatment, he has before him the complete history of the patient so that he can see the effects of previous oral medication and can compare these with those following other modes of treatment. During the course of the clinic, usually at its close, there is always a brief discussion on the medication given, with reasons for using the procedure employed. These discussions prove of great interest to the student.

Whether an experiment of this kind will be permanently successful is not certain. Much depends on the personality of the pharmacologist and his interest in working with patients. It means substituting investigative work, in part, on patients rather than animals. In fact, the success of both of these experiments depends on the personality of the instructor involved and the physical and clinical facilities that he has available.

Discussion

On Papers of Drs. Hirschfelder and Wahl

DR. E. P. LYON, University of Minnesota: I think that Dr. Hirschfelder's work at Minneapolis was, perhaps, a secret! Of course, I knew in a general way what he was doing; but I was very much impressed by his paper, because it is one of the best we have had in a long time, in substituting actual tests for opinions. It really is the report of an educational experiment.

There are a few other things of similiar character which we have done and which you might like to know about. In the first place, among the efforts of "freshman week' is a series of talks by various deans, or somebody representing them, on the work of their respective schools. For two or three years I have given talks to the incoming freshmen (I mean those of the Arts College), who wished advice or opinion in regard to preparing for medicine. It is surprising the amount of interest that these lectures created.

In the course of these talks I take occasion to discuss briefly what the premedical course is, and why various subjects are in it. I also tell them they would get the same subjects—physics, chemistry, and so on—in the medical school if they were in a German or other mid-European university; therefore, they are really as much in the medical school at that time as they will be two years later. The fact that a good many of the students come around from time to time is proof that the effort is worth while.

In my own department of physiology, we have a course we call clinical physiology; it is an effort to correlate physiology and medicine. Dr. Greisheimer has organized a very good series of lectures, and one which creates much interest, as is indicated by the fact that at least half of the students take that course although it is elective.

We have talked a great deal about correlation in this association for many years. It occurs to me that the two papers this morning begin to show actually how it may be done, and that is what, to my mind, gives them unusual importance.

DR. TORALD SOLLMAN, Western Reserve University: It does not seem to me that we are discussing a new subject at all. I think the correlation between the scientific and the applied in medicine dates back to the very beginning of scientific viewpoints in medicine, at least to Hippocrates. At the present time I do not believe that there is a medical scientist who has not somewhere in his mind the question of the application of what he is investigating. Similarly, I doubt whether there is at the present time a clinician teaching, who does not wish to make his teaching as scientific as he at least can make it. There is in practically all medical teaching at the present time more or less correlation. It is simply the ways of working out the subject that is the real problem. The developments of medical science are constantly changing, and, therefore, our methods of application have to change with them.

That is one reason why I believe that no single cut-and-dried plan toward correlation is going to be the thing. What is needed, and what we all, I think, have—only we want to put it a little more consciously in our minds—perhaps, is the will to correlation. If that will is there, a way of giving expression will undoubtedly be found. That way will vary, I am sure, with each of us. However, we all can profit by the experience of each other.

A point or two, perhaps, requires further thought, even discussion here, certainly for ourselves. Dr. Hirschfelder brings out what appears to me to be an excellent method, namely the method of asking questions; written questions or oral questions make no difference in this correlation of applying the

scientific things to the clinic. The great advantage of the question method is, it does keep the subject, the need of correlation, constantly in the minds of both the instructor and the pupil.

There is one difficulty in it, however, and I have not the solution of it. That is, that the application of that plan makes it very difficult for the non-medically trained teacher. This thing of sitting down of an evening with the clinician and pumping him for methods of applying that knowledge, does not sound so very good. For one thing, he might not get all the points, and, for another, the student would be very apt to ask embarrassing questions which he would have to take back to another evening session! Just how to get around that, I do not yet know; it should be gotten around; it should be made possible. I think it can be made possible if the premedical teacher wants to make it possible. It is not a question of an evening or two; it is a question of getting himself into a medical atmosphere as part of his training. I do not believe that it is necessary and it is not very practicable to require that every preclinical teacher, every man who is to teach medical students, should take a complete medical course. We would not get enough teachers. That is the simple reason why that is not practicable. But they should take enough of the medical course and they should keep sufficiently in contact with clinical points of view, so that they will not need this weekly evening to which Dr. Hirschfelder alludes.

The difficulty that I see in Dr. Wahl's experiment, and I should like to have him discuss that a little more, is how, under these conditions, the pharmacologist gets time to attend to his job in pharmacology; that is, if he gives every afternoon, let us say, to running a clinic. Of course, it is very fine if he has the opportunity of personal clinical applications of experimental pharmacology; but his primary job, after all, is the experimental pharmacology. It is his primary job, because if the pharmacologist does not do experimental pharmacology, who will? If the pharmacologist does not do treatment, somebody else will give some kind of treatment; there is no doubt about that. So I should like to know how this plan is managed, so as to leave the pharmacologist with enough time to attend to his primary duties.

Dr. A. Primrose, University of Toronto: In the paper which I shall read presently I make a statement regarding science teaching which I dispose of in one sentence, namely—"These subjects should be taught as pure science; the practical application comes later."

I have listened with great interest to Dr. Hirschfelder's paper and also to the paper of Dr. Wahl. I am not sure that the opinion I express in my paper is altogether inconsistent with what the readers of the papers have said. Various methods are in their experimental stage.

In the discussion someone spoke of the field we had to work upon, namely, the individual student. There is a real danger of confusing the issue, confusing the student's mind, and giving him an amount of material, when we are attempting to make clinical applications, which will be valueless because he inbibes a heterogeneous mass which he cannot digest. In my opinion, these preliminary sciences should be taught without indication of their application to medicine.

A good many years ago I took charge of the Department of Anatomy at the University of Toronto, and I taught that subject for many years. I was advised, when I took the Chair of Anatomy, to make no reference to its clinical application. That may seem absurd in the light of present day observation and experiment, but I never regretted that stand. I believe it was

sound. I found I could interest the students, give them a knowledge of anatomy, and teach them better by avoiding reference to clinical application in their early years.

In the University of Toronto we carry the subject of anatomy through to the final year. I may say we have a different system from that which is common in the universities of the United States, namely, that our premedical years are part of the university course. We have a course in medicine which extends over six years. A student comes to the university and enters the medical school in his primary year, and he takes all his primary science subjects in the university. In one aspect we speak of it as a seven-year course, because we insist upon honor matriculation before beginning his course at the University, including mathematics, English, Latin or Greek or a modern language and physics or chemistry.

The opinions expressed by the reader of the paper are not altogether inconsistent with the system which is adopted in the University of Toronto; for example, in the Department of Physiology, that subject is taught without any reference to its application to medicine. But at certain intervals, say once a fortnight, a class assembles for the purpose of presenting in very brief outline the clinical application of the work which they have just completed in physiology. The students are interested and they understand the value of their studies in their application to practical medicine. I believe that is as far as we should go. Personally, I do not believe it is right to bring the students in the primary years in touch with the patients. I believe you are confusing the students' minds and you are giving them a conglommerate mixture, which it is difficult for them to digest. These sciences should be taught as pure science.

Much of the work which Dr. Hirschfelder referred to is covered in our class in experimental pharmacology.

There is one aspect of the case which has not been touched upon, of which I should like to speak in connection with the method we have adopted in the University of Toronto, namely—In the final years we see to it that there are certain individuals who are responsible in the clinic for carrying over methods of physiology, and so on. Thus, in the Department of Medicine, in the wards, we have one of the staff who is a trained physiologist and has gone into clinical medicine. We have another man who is a trained bacteriologist and has gone into clinical medicine. We have a third man (and this man is most useful in our clinic) who is a trained chemist and has gone into clinical medicine. Finally, we have a man who is trained in serology and immunology from the laboratory standpoint.

I think the method I have described is really much more important in applying the principles of the preliminary sciences in the final years at the bedside, than the attempt to take the primary student to the bedside. In other words, my opinion is that these preliminary sciences should be taught as pure science, and some occasional attempt may be made to show the student that he is really studying something which has a clinical application. Later on, an effort should be made in the clinic to see to it that we have trained men who are capable of interpreting clinical material in terms of physiology, anatomy, bacteriology, and so on.

Dr. Torald Sollmann, Western Reserve University: Might I ask Dr. Primrose a question as to the apparent inconsistency, on the one hand, of insisting that these should be taught without application; at the same time, however, introducing lectures to show them their application?

DR. A. PRIMROSE, University of Toronto: In reply I may say that the argument is again and again put forward in the discussions to which I have listened, and in which I have taken part on certain occasions, that the student is proceeding with the preliminary sciences without knowing anything of their application, and he does not know where he is being led, and so on. In an effort to meet that situation in a simple way, after the subject has been presented from the standpoint of the pure science, e.g. physiology (I am speaking of physiology, particularly now) the class is then taken, say at the end of a fortnight, and for an hour there is a rapid review of what has gone on, indicating what clinical applications there may be.

It does not take much time, and it gives him, at all events, a viewpoint which demonstrates that the science in which he is being trained at the moment has a value in its practical application of medicine.

DR. A. W. STEARNS, Tufts Medical School: It has seemed to me, as I have followed the discussions that have been before this society, that we might well regard the whole matter of medical teaching as an experiment, and consider the two factors in any scientific experiment; first, the stimulus which is being applied, and second, the quality of the subject to which that stimulus is applied.

Most of our discussion has had to do with the stimuli which we are applying to our students and, perhaps, too little with the qualities of the students. Mathematical, or, if you will, scientific interest is about as highly specialized a quality of the human mind as we can find, so it will be discovered in a relatively small number of our students. For that reason I think we can explain the fact that most students tend to do better in their clinical years than in their so-called scientific years.

The amount which we remember is dependent, first, on the attention of the individual, next on the strength of the stimulus and lastly on the number of times the stimulus is repeated. I think there can be no doubt, in medical education, that the stimuli are very strong, and they are certainly repeated often enough, but the attention of the student is dependent on interest. A man reading a book will go through a crowded street in an automobile and not notice what is going on. So, unless we have the interest of the students, we are not going to fasten the subject on them. For this reason, it is very gratifying to hear these papers which have to do with making scientific subjects interesting and this seems to mean a new era in which scientific medicine is to be made more attractive. After all, if the majority of our students do not have a scientific bent, and if we put our chief emphasis on the scientific phases of medicine, we are probably neglecting from 85 to 90 per cent of the qualities of mind possessed by the students.

DR. IRVING S. CUTTER, Northwestern University Medical School: This sounds exactly like the average discussion that occurs in most faculties of liberal arts. There certainly can be no pedagogic quarrel with giving the student a purposeful objective; outlining to the student what he is aiming toward. I am not so sure that many can do what Dr. Hirschfelder has actually accomplished for he is unusually well qualified.

We have decided at Northwestern that the trouble with the work of the first two years is that the student puts his pharmacology into a little box, and when he nails the lid down, he says, "Thank God, I am through with that." The teaching of pharmacology and the other subjects of the first two years must be continuous. It is a great mistake to teach pharmacology, and then forget it. For instance, Dr. Ivy is giving the juniors a course entitled

"The Physiology of Symptoms." It is one of the most popular courses in the curriculum. Dr. Simonds in pathology is giving a course on the pathology of symptoms. In other words, the teaching is continuous.

DR. H. G. WEISKOTTEN (Syracuse University): One question occurs to me in connection with Dr. Wahl's experiment, and that is whether it is wholesome for the clinician and wholesome for the students assigned to the clinics, to permit a clinic to refer its cases to another clinic for treatment.

I can readily see where it may be desirable for the Department of Pharmacology to be given an opportunity to apply their pharmacology. I can also readily see where many clinicians would be very happy to refer their cases to another clinic for treatment, but I rather question the wisdom of permitting them to do so.

DR. CHARLES H. NEILSON, St. Louis University: I happened to have been a teacher in both sides of medicine, namely, the fundamental sciences, physiology and biochemistry, and developed into a clinician. I am in favor of teaching pure science the first two years, and teaching the application in the last two clinical years by men who are fitted to do that. The bulk of our medical teaching in the last two years is done by men who have graduated in medicine.

The amount of chemistry, physiology, bacteriology, and what not, that is learned in the ordinary medical school is hardly sufficient for a big, broad grasp of a subject which a specialist would have. So that by the time a man has passed these two years of clinical medicine, and has had his internship, he is made a clinical teacher. The bulk of our clinical teaching is done by young men whose grasp on the fundamental subjects is very limited. Consequently, we cannot expect our men to learn the applications they should have.

Dr. Hirschfelder spoke about having the fundamentals go to the clinician, or the clinician come to the fundamentals and have an evening with them. I think that is a rather dangerous procedure, in view of the many phases of clinical medicine. I should much prefer to take the young clinicians who are teaching clinical medicine, and compel them to come back into the fundamental years and take some of it over again until they learn how to teach, because by that time their grasp will be better, and they will have more in clinical work.

DR. G. CANBY ROBINSON, New York Hospital-Cornell Medical College Association: We have had an opportunity of experimenting in a natural way with correlation of teaching at Vanderbilt University. In building the new plant there we had the fundamental idea that we should arrange the departments so that there would be very ready intercourse between the various parts of the hospital and its laboratories and the laboratories of the medical sciences. We have let the correlation take its own course.

It has been interesting to see how the relatively small group composing the faculty at Vanderbilt, working together rather intimately, has worked out these problems of correlation. In biochemistry, the professor of biochemistry is a Ph.D., but he had seven years' work in a research hospital, and became quite familiar with clinical problems. He has, of his own initiative, gone to the clinicians and asked them to come in from time to time to talk about the biochemical problems of disease. I feel that that is the right way to establish correlation with the clinical aspects during the period of study of the preclinical subjects.

I have always opposed any efforts to force the clinical aspects upon the laboratory workers, but if the impetus and stimulus comes from them, and

they can find the clinicians that can cooperate with them intelligently, then it is another matter.

In the same way, the Department of Preventive Medicine and the Department of Bacteriology have worked out a plan of cooperation more or less naturally, without any formal effort, and they have been interchanging, the bacteriologist taking over some of the lectures and demonstrations in preventive medicine, and the Department of Preventive Medicine taking over some of the work in bacteriology.

There has developed a natural interest among the students during their first two years in some of the activities of the clinical laboratories, for instance, in the bacteriological work, and particularly in the physiological work of the medical clinic.

Dr. Gary gave me an interesting example of correlation. He was teaching the properties of the heart muscle, and two of his students went into the adjoining laboratory where the clinicians were working on cardiac arrhythmias. The students came back and told their classmates how interested they were to see the clinicians applying the very things they were studying in physiology. I am quite a believer in the importance of physical contact in bringing about what I have called a natural correlation. In our experience this has worked out remarkably well.

I think that Dr. Hirschfelder's remark that the students may shed their laboratory training like water off a duck's back when they enter upon their clinical studies is, after all, one of the fundamental problems that we have to deal with in medical education. The arrangements of the physical plant and the working together of teachers as a united group will do much to prevent shedding of knowledge of the basic medical sciences.

Dr. J. S. Rodman, National Board of Medical Examiners: As you know, the qualifying part of the National Board's examination attempts to correlate the fundamental subjects with clinical subjects. We find that the students in the schools where correlation has assumed the greatest importance, do very much better in this type of examination than those coming from schools in which there are more distinct water-tight compartments between the fundamental and the clinical subjects.

Dr. Ray Lyman Wilbur, Stanford University: I am always struck, when I hear discussions of this kind, by the great misfortune that came into the world when some man invented the pigeonhole, and we began to get our knowledge blocked off in these little places, where we could put things in in apparent order.

The great difficulty I found in the practice of medicine was that my patients always jammed up against the walls between the pigeonholes and never quite fitted. It seems to me that our real problem is that we have a profession engaged in an application of a whole series of things that we call by different names. We are not quite sure, when any one patient turns up, which one to use.

We divide medical education, hospital staffs, and all that sort of thing, in various ways, and the result we get is confusing to the students.

The talks we have had here this morning are very encouraging to me, because they bring out clearly that fact, but they are particularly encouraging because there is so much disagreement. Thank God, we have something upon which we have not been able to get any standardization as yet.

Dr. A. D. Hirschfelder, University of Minnesota: I should like to admit right at the start that any questions to which my paper may have given rise,

as, for example, Dr. Primrose's, brings you right down to your religion of medicine, whether you believe that the pure sciences should exist by themselves, or whether you believe that those pure sciences may also be applied.

It reminds me a little bit of what the former dean of the College of Engineering at the University of Minnesota, who was a very cultured man, said to me once. I met him at lunch, and he was very happy. He said, "I have just found out what a cultural course is. Anything that isn't of any use is a cultural course."

In the same way I should like to say I will admit everything that Dr. Primrose says, providing that he makes the division which the fundamentalists in religion make, that man is not an animal. If he believes that man is an animal, then I will make the claim that man is, from the standpoint of medicine, the best of all animals, and, from the standpoint of the budget, he is the cheapest. Since our students are going to be trained to study sick men, and sick men become sick very largely because something happens to their anatomy, or something happens to their physiology, I do not myself know why an overstimulation of the vagus that happens to produce a sinus arrhythmia in man is any less a stimulation of the vagus than one which is produced in the laboratory by means of the electrode.

It seems to me, and I have found it so (I will be dogmatic and say so) that whenever I have been able to speak of the action of the drug or the physiological process in terms of what happens in the human animal, it has been more interesting and it has been more impressive. However, I do not want to leave with you the idea that at the University of Minnesota, we do not teach with animals, or that we overlook the actions of drugs on the different parts of the nervous system, glands of secretion, and so forth. However, in addition to doing that, we aim (and I hope without taking too much time) to bring that out in terms of pathological physiology as well as of just the unrelated animal.

I will grant, with Dr. Primrose, that it is largely a question of time; it is a question of the distribution of the time that you take. If you take too much time off of it, you neglect the fundamental actions. I agree with Dr. Primrose that if you do that, it is wrong. If, on the other hand, you emphasize to the student the very thing you want to teach him in the pure science by means of something which is clinical, then it adds the element of interest and also the element of correlation, and that is the right thing to do.

As regards the question of the philosophy of teaching a pure, unapplied science, we have to consider the fact that (the experiment in the Department of Education, School of Education at the University of Minnesota would seem to agree with those elsewhere) between spring and fall in well taught courses the average student has forgotten between 35 and 45 per cent of the facts he learned in the spring quarter. If that is the case, everything we can do to perpetuate his remembering is, I think, decidedly worth while.

The next question is the one Dr. Sollmann brought up about the practical facility of bringing the fundamental scientist and the clinician together. I will confess for myself that I spent ten years in internal medicine at Johns Hopkins, about fifteen years ago, during which time I gave a course in physiology of symptoms. I am heartily in favor of that. The only thing I should like to say is that, if certain physiological processes give rise to a symptom, it does not hurt, I think, to mention it at the time you are talking about it; but do not take too much time.

As regards the question which Dr. Neilson raised, which I had not thought of, because I had never had the experience, the danger of bringing

together the clinician and the fundamental scientist, to give the fundamental scientist a few tips as to how things were actually and practically being applied; I could realize that if it happened to be Dr. Carlson or somebody equally muscular, it might be dangerous for a clinician, and possibly I might find it dangerous if I happened to meet with Dr. Neilson. I will not pass on that. I certainly did not have in mind that a teacher of a fundamental science should take one clinician on one evening and simply squeeze him dry like a lemon.

I do agree with Dr. Sollmann, that if there is a strong will on the part of the teacher of the fundamental sciences to acquire these applications, he really will not have great difficulty in occasionally meeting enough clinicians on the stairway, or some place, and asking one a question and later ask a similar question of another, and in gradually gaining a pretty good all around view of things. But I should like to bring up just one question that Dr. Sollmann raised as regards the actual method of application. I will agree with Dr. Sollmann that there is no difference whether questions are given in oral quiz or in written quiz, except the question of time. It is hard to cover ground with large classes. One could put down a good many questions in a laboratory notebook. It would hardly allow the pharmacologists enough time to cover them in a quiz course.

On the other hand, at Minnesota we are suffering from the problem of very large classes with small staffs. The reason we have incorporated these questions in the notebook is because it puts before the student in a large class practically all of the questions which the ideal teacher, with plenty of time, would ask personally of each student, provided the classes were small enough. Our classes at the University of Minnesota, unfortunately, are entirely too large to do that, and that is the reason we have the things in this form.

I should like to say one thing more, and that is whether the questions become a nuisance or whether they become a help to the students, depends entirely on the attitude and spirit of the instructor. We try to present to the students the fact that these are merely questions intended to call their attention to things that probably would otherwise escape their attention, and merely things for them to work out for their own benefit, in their own way, without making them read a lot of books, which they would not have time to do. Again, we also tell them that when anything is not clear in their minds, which they cannot themselves work out the answer for, they should come and discuss the matter with one of the instructional staff.

Dr. H. R. Wahl, University of Kansas: This work is, of course, experimental. Two of the questions asked hit the very things we were a little in doubt about, as to whether the experiment would be a success. In answer to Dr. Sollman's question as to the way in which this was carried out: I did not go into those details, because I did not want to take the time unless specific questions were asked.

The treatment clinic is held three times a week, not every day, and usually occupies a period of one and one-half to two hours. In other words, the pharmacologist never needs to be there more than six hours a week; oftentimes one hour is all the time he has to be there. We afford considerable assistance. He has a physician as his assistant, a nurse, and two technicians, and much of the work is taken care of before he gets there. That is done in order to economize his time. One reason we were anxious to do that was to give the pharmacologist some contact directly in the clinic. We do not expect him to take care of all the treatment work, by any means.

Answering the second question, the type of treatment the pharmacologist looks after is only those special types that require some special form of administration on the patient, not the ordinary routine prescriptions.

As to whether it is wholesome to refer patients from the other clinics to this special treatment clinic, the only answer I can make is that the clinical men are all strongly in favor of it. They were a little in doubt about it at first, but the way it has worked out has been very satisfactory to them. I think the whole matter depends on the personality of the instructors. Our group seems to be very enthusiastic about this, both on the clinical side and from the standpoint of the pharmacologist.

Education of Surgeon

In England most of the medical schools are directly connected with a hospital, and the entire training, premedical as well as medical, takes place in direct contact with the sick. It is gratifying to see that many of our schools are giving the entire fourth year of medicine in the hospital, and are planning to add hospital training in the third year as well. It is a waste of time for a medical student to spend three or four hours in a surgical clinic watching the removal of a brain tumor, but he should be taught thoroughly to perform surgical operations in emergencies, such as strangulated hernia, acute appendicitis and traumatism, rather than the technic of the surgery or expediency, in which time is not the supreme factor. In other words, the specialized training of the surgeon must come after graduation in medicine. The recent graduate in medicine who desires to become a surgeon should at once adopt some problem of research either in pure science or clinical investigation. It may be and probably will be that the research of itself will be of little value except to him, but it will help to develop his scientific imagination, that is, the building of images to be compared with known facts. It will also teach him to appreciate the spirit of research which inspires many men, even if he himself does not acquire this spirit. I hope that the time will come when every young surgeon, after special training of at least three years, will take a master's degree in surgery.—WILLIAM J. MAYO: *Surg. Gynec. & Obstet.*, 47:884 (Dec.) 1928.

Director of the Teaching Hospital: Dean or Superintendent*

A. C. Bachmeyer
Dean, College of Medicine, University of Cincinnati

Every hospital must be, in the broadest sense, a teaching hospital. For the purposes of this discussion, however, we confine our remarks to the hospital in which medical students receive a most vital part of their professional education.

It requires no argument before this audience to establish the fact that there must be the closest alliance, integration and cooperation between college and hospital in order to promote the greatest efficiency in the work of both institutions.

Primary Function of Hospital

The primary function of every hospital is the care of the sick and injured and nothing dare take precedence over this, its paramount responsibility. Other functions, while of great (and in some ways of almost equal) importance, of which education is the foremost, must, nevertheless, always be subsidiary to the primary one.

Primary Function of Medical College

The primary function of the medical college is to train young men and women in the fundamental principles of the art and science of medicine; to give its students a broad and sound basis on which they may build their future professional careers; to furnish them, as has been said, with working tools which, through practice and experience, they may become skilled in using for the benefit of humanity. The college also has other functions to perform but these, too, must always be of secondary consideration.

Hospital Administration

A detailed analysis of the various activities necessary in the performance of these primary functions of both hospital and college would occupy too much time and would not be fitting, for you are all quite generally acquainted with them. Let us remind ourselves, however, that the modern hospital is a rather highly complicated organization in which an ever increasing number of workers, representing professional, semi-professional and lay groups of varying degrees of training and experience, are employed. The organization and supervision of this personnel, so that it may perform its service in the most economical, efficient and humane manner, always to the patients' greatest benefit,

*Read at the Thirty-ninth Annual Meeting of the Association held in Indianapolis, October 29-31, 1928.

is no small task. Hospital administration is an endeavor that is worthy of the best mettle of well trained men and women. It is most unfortunate that there is no definite course of training available for such administrators other than that of long years of apprenticeship, and that most hospitals must depend for their administration on men and women whose training has been primarily for some other field of activity and whose interests are only too often focused on something other than administration. Our teaching hospitals can, however, command the services of men and women who have spent years in developing and demonstrating their executive ability.

College Administration

The advance of medicine, with the subsequent development of many specialties and the multiplication of college departments; the endowment of these departments operating in some instances so as to cause their over-development and to give them an independence not enjoyed by other departments in the same college, have also increased the complexity of college administration. Where in former years a comparatively small group of men, constituting the faculty, assembled and discussed the curriculum, methods of instruction and other college affairs, we now have faculties numbering in the hundreds. The members of one department hesitate to discuss frankly affairs under the control of another department for fear of being accused of interference or of prejudice or more often because they are not competent to do so. The Dean, who was the leader of the group, and older in years, experience and service, if he still exists, finds his time encumbered with administrative affairs, conferences and committee meetings. His energies are devoted to tasks which in many instances are distasteful to him. Under such conditions, if he is engaged also in teaching, he cannot give the attention to his pedagogical tasks that they rightfully deserve, or he finds that he has no moments to devote to the study of his own specialty or to research. In view of all of this development, we find that in many colleges the dean today is an administrative officer, whose primary duty, if not his sole duty, is the administration of the institution. Many other factors enter into our consideration.

Expense of Hospital Administration

Hospital operation is becoming increasingly expensive and there seems to be no relief in sight. That the cost of operating the teaching hospital is greater than in the non-teaching institution is so apparent that no argument is needed to demonstrate the fact. So long as this additional cost can be justified by a greater benefit to the patient, it can be passed on to him or to the source of his support. When it cannot be so justified it must rightfully be charged to education and the payment of it obtained from some other source.

The Factor of Time for Teaching

Since an ever increasing amount of the time in the third and fourth years of the students' college career (and to some extent in his sophomore year) is being devoted to clinical study, the hospital is called on to admit him to its patients' quarters. This often produces complications. There must be a consequent readjustment of schedules. Time must be allotted for nursing procedures, for nourishment and meals, for cleaning service, for trips to diagnostic laboratories and for special therapy, for the patients' visitors, and for nature's greatest therapeutic agent, rest, before time is given for matters that are of secondary importance to the patient. This, naturally, limits the time for student instruction and is often the bone of contention.

In a number of instances this point is emphasized because of the fact that there are too few patients in comparison to the number of students, and, consequently, too much disturbance for the former.

Many other factors might be mentioned but it is felt that to do so would only be time-consuming and that these will suffice to indicate some of the problems involved in the relations of hospital and college.

The Patient's Interests

If the patient's every interest (physical, social, spiritual and material) is not made of primary importance, then we are failing in our educational endeavors. If in any way we subordinate his interests, in our enthusiastic desire to emphasize a point in diagnosis or therapy to the student, we are failing in the broader field of demonstrating the practice of medicine properly and in upholding the high ideals of our profession.

The Director of Hospital and College

What I have been endeavoring to indicate is that in my opinion it is rather beside the point to argue as to whether the dean or the superintendent should direct the teaching hospital. The need is for a well trained executive to head the organization. I believe that an able medical administrator is needed for college and for hospital. If two men are utilized, one as dean and one as superintendent, then neither can be subordinate to the other. Each should have knowledge of the other's problems, heading, as they do, two organizations that must work in closest harmony, each having a primary function to perform that depends on the other for its best performance and development; therefore, it is essential that the finest kind of team work exist.

If one man serves as administrator of both college and hospital, then he must be fortified with capable assistants. No one man can carry all of the duties and responsibilities involved in the administration of institutions of the size of our medical colleges and their allied hospitals.

This director or administrator must clearly keep in mind, however, the paramount function of the hospital, which, I believe, then becomes

his primary responsibility. He must be prepared to make the fine distinctions necessary in small matters which pertain to the patient and at the same time involve educational factors.

I have purposely avoided the citation of many petty details, for if we can agree on the broader and more basic principles involved, we can approach specific problems with greater hope of solution. Local circumstances, personalities and policies will always exert their influence on the solution of any particular situation. There are, of course, many other problems involving the performance of subsidiary functions —the care of private patients, the disposition of professional fees, the distribution of the cost of research—that are often the source of difficulty. These will vary with the local situation and with the policies adopted. They should all be analyzed on the basis of the primary functions. However, clear cut announcement of policy should be made by contributed authorities after such analysis and those policies must be carried out by the executives assigned for that purpose.

If any executive, because of his personal opinions, cannot impartially enforce the policies prescribed there are only two things for him to do: convince the authorities that the policy is wrong and make proper recommendations, or resign.

Discussion

DR. MAURICE H. REES, University of Colorado: The administration of a teaching hospital seems to be very different from that of the non-teaching hospital, especially if the hospital is owned and supervised directly by the School of Medicine. In the latter case I do not see how it is possible to run the hospital satisfactorily with a superintendent having the same rank and same standing as the dean of the School of Medicine. I think there are a number of deans present who can cite instances of difficulties they have had along that line with the superintendents of hospitals.

To my mind, the superintendent of a teaching hospital, owned by the school, should at all times be under the direction and supervision of the dean of the School of Medicine. In fact, I believe further that the dean should be a man who is qualified to be the medical supervisor of the hospital. The business administration of the hospital can be turned over to some one specially qualified for that sort of work.

Dean Bachmeyer mentioned that there was no school for the training of such people. I understand that there is such a school at Cornell University. They do not call it "Hospital Administration" but they call it "Hotel Management." That means practically the same thing.

The business manager of a hospital, outside of the clinical supervision, the medical supervision of the hospital, is primarily a hotel manager, and his business relations and his business activities are very similar, if not the same, as those of a hotel manager. So with the medical supervision of the hospital directly under the dean, then with the dean having as his assistant a business manager who takes care of all of the details, such as purchase and issuing and the supervision of the utilities of the institution, and with a sufficient staff of resident physicians, and so on, there is no reason why the administration of both the school and the hospital should be an undue burden

on the dean. I am heartily in favor of the dean supervising both the hospital and the medical school.

In our institution we have had experiences along both lines. We have had an experience in using a business man, a politician, as superintendent of the hospital. We have had the experience in using a medical man as superintendent of the hospital. At the present time we are attempting to run the hospital under the supervision of the dean. I assure you that by the latter scheme there have been no quarrels between the dean and the superintendent of the hospital.

DR. H. R. WAHL, University of Kansas: For the past four years the dean of the school has also been superintendent of the hospital. The reason for that is largely to bring about coordination between the hospital authorities and the medical school group. Frequently there was friction between what the medical man wanted and what the hospital authorities wanted. In order to remove that friction, this plan was adopted. I might assure you that it has worked out very successfully. But there is one very important factor, and that is the dean must be supported by very efficient assistants who can take care of all the routine work, so that all he needs to do is establish the policies and settle differences that may occur.

Of course, our institution is a small one, and there may be difficulty in handling such a plan in the larger institutions. Moreover, the dean has much more influence with the different members of the professional and teaching staff, in showing them the viewpoint of the hospital superintendent.

DR. ROBERT WILSON, Medical College of the State of South Carolina: The problem with us has been worked out very much along the line suggested by the last speaker. The superintendent of the hospital is the business head. He manages all the hotel arrangements, if I might use that phrase again. The professor of medicine is physician-in-chief of the hospital and is responsible for the entire medical service; the professor of surgery is surgeon-in-chief of the hospital and is responsible for the surgical service. They sit with the board of trustees, all of whom are members of our faculty, in an advisory capacity. The superintendent leaves the details of the medical and surgical services to the heads of these departments in the hospital. The dean at the present time happens to be the professor of medicine, and in virtue of his position as physician-in-chief, sits with the board of trustees and is in constant touch with the whole situation. This arrangement works very happily and satisfactorily with us.

DR. PETER MARSHALL MURRAY, Howard University: This question of who should direct the hospital, the dean or the superintendent, is one of transcending importance in our own particular institution. We have now embarked on a program of expansion, of reorganization. We find that one of our greatest obstacles is in realizing what we know to be the ideal of medical education, the relation of our hospital to our medical school.

We happen to be partly a ward of the government. The hospital is a government institution, out and out. It has a superintendent who is styled "Surgeon-in-Chief," a hangover from old army days. We have splendid cooperation between the superintendent and the dean, but there are fundamental differences which cannot be smoothed out. We are now in the midst of a contest, so to speak, to get the proper relationship between the medical school and the hospital.

I do not know that a similar situation exists anywhere else, but we have an unnecessary duplication. With our limited funds and limited personnel, we

find they share waste of material and waste of money and waste of opportunity with the hospital functioning independent of the medical school, as regards some of the more fundamental branches.

I might cite the department of roentgenology and the department of pathology, and one or two other departments, in which that division in the hospital has nothing to do with the similar division in the medical school; thus entailing a double expense, with a failure to utilize the facilities which the hospital offers and which ought to be utilized fully for the teaching of students.

I have proposed this solution: That the hospital, the hotel part, as has been so aptly stated, should be under a superintendent who might be responsible to the government, but the professional side of the hospital ought to be directly under the faculty of the medical school presided over by the dean.

It seems obvious that that ought to be done, and yet it has been with great difficulty that we have tried to get our men to see it. We have such a proposition in the Harlem Hospital in New York, where the professional side of the hospital is entirely under the medical staff, and in that way they have no difficulty in having their professional adjustments, development of courses, and that sort of thing, put into effect immediately. It is not necessary to get the consent and the cooperation of the man who might be superintendent of the hospital. All they look upon is the introduction of new things which are indispensable to the training of medical schools. He simply sees them as some added administrative difficulties on his hand.

Our department of obstetrics is now in course of reorganization. Just the other day I had a letter stating that a splendid plan has been presented, but it is held up pending a conference to correlate the present staff of the hospital, appointed by the superintendent without regard to teaching, and the proposal advanced by the dean of the medical school. That is a very great part of our difficulty.

Reverend Alphonse M. Schwitalla, S. J., St. Louis University School of Medicine: I should like to say a few words about an arrangement considerably different from the others that have been mentioned here. At St. Louis University we found ourselves in the rather unusually fortunate position of accepting a privately owned hospital for our University Hospital. The Sisters of Saint Mary extended to St. Louis University the entire use of the three institutions in St. Louis controlled by them—St. Mary's Infirmary, St. Mary's Hospital and Mt. St. Rose Hospital. The first of these is entirely a teaching institution. It is a charity hospital of 125 beds, all of which are accessible to the members of the staff. St. Mary's Hospital is used for the private practice of the staff men, but offers unusual teaching facilities, since the staff is restricted and in addition it affords many free beds. Mt. St. Rose Sanitarium is a tuberculosis hospital, three-fourths free or part-pay and supported only to the extent of one-fourth by patients' fees.

St. Louis University is thus free from financial responsibility while enjoying the same professional and educational facilities which it would enjoy if the institutions were entirely owned by the school. The business administration is vested in a board of which the dean of the School of Medicine is the chairman and on which there sits the superintendent of the three units of the University Hospital and three members of the staff, namely, the directors of the departments of internal medicine, surgery and gynecology.

The directors of all the departments in the hospital are at the same time the directors of the corresponding departments in the various units of the University Hospital. The final professional responsibility rests entirely with the dean of the School of Medicine.

DR. WILBURT C. DAVISON, Duke University: In order to learn from the experience of those here which of the two types of organization under discussion has been the most satisfactory, I should appreciate it if those would hold up their hands who believe that the dean of the medical school should only be responsible for the medical school and that the superintendent of the hospital should be independently in charge of the hospital (2 votes); and if those would raise their hands who are in favor of the dean being responsible for both the medical school and hospital with a hospital business manager as an assistant (78 votes).

DR. E. P. LYON, University of Minnesota: The Minnesota arrangement is just the same, except that the hospital is recognized as a department, in the same sense as is anatomy. It does teaching. The superintendent is of the same rank as the head of a department.

DR. MANFRED CALL, Medical College of Virginia: The hospital also has an equal responsibility for nurse training. The educational requirement of the nurse may conflict with the personal service required by ward patients. I should like to ask Dr. Bachmeyer how he reconciles this with his present scheme.

DR. WALTER L. NILES, Cornell University Medical School: At Cornell, in our new development with the New York Hospital, we are trying a different plan. We are subordinating the dean, which does not seem to be the popular thing to do. In order to fuse the interests of the hospital and the medical school as closely as possible, we decided to appoint a director of the association, and he will be superior to the hospital superintendent. He is intended to be the leader of the whole organization.

DR. A. C. BACHMEYER, University of Cincinnati: The discussion brought out the point that there can be no single solution of the problem. We have heard an outline of a number of different types of organizations.

The point I was trying to make was that we have to agree on some basic principles, and then try to apply them to the various situations. I cannot agree with Dr. Rees that hospital superintendency is only hotel management. There are many, many other factors involved.

The financial questions, of course, are always going to present considerable difficulty in our teaching hospitals unless the medical college itself is responsible for the entire financial program. If we have a business manager, or another board is involved, that has responsibility for the business elements, then that board, or that manager, must have a medical viewpoint, a college viewpoint.

I do not think we can have any one solution to the entire problem.

The Training of the Specialist, with Special Reference to Surgery*

A. PRIMROSE
Dean of the Faculty of Medicine, University of Toronto

The medical curriculum today is of necessity, a lengthy course of study. The primary object of this course is to train men for the practice of medicine, as general practitioners. The only method of keeping the time limit of study within reasonable bounds is to see to it that the individual teachers are restricting their courses of instruction, to those principles of the subject which are essential for efficient performance on the part of one who eventually graduates in medicine and goes out into the field of general practice.

Lest one should be misunderstood, I do not wish to infer that the preliminary science subjects should be taught, as the hackneyed phrase puts it, "in their application to medicine." These subjects should be taught as pure science; the practical application comes later. On the other hand, the fundamental sciences, such as anatomy, physiology, biochemistry and physics should be restricted in their scope within certain limits. The limit indicated is determined by the fact that modern medicine demands of the practitioner today a thorough training in these preliminary sciences, sufficient to enable him to approach his clinical problems in the scientific spirit. He should be able to apply the principles of physiology, anatomy, chemistry, etc., in the diagnosis of disease and the treatment of his patients.

Tendency to Special Practice

Undoubtedly the number of graduates in medicine who enter on the practice of a specialty is increasing. Recently Weiskotten found in the case of 2,905 graduates of fifty-two medical schools that 22.5 per cent were in general practice, 37.7 per cent were in general practice but pay special attention to a special field of practice, and no less than 39.1 per cent limit their practice to a specialty. We cannot overlook the claims of such a large percentage of our students. There is, however, no room today in the undergraduate curriculum in medicine for the training of the specialist either in preliminary science subjects or in the clinical departments. The training of the specialist must of necessity be undertaken as post graduate work.

On graduation in medicine from a university and after receiving his diploma or license, a man is officially pronounced capable of undertaking medical practice in all its intricate ramifications. Fortunately, most people know their limitations and refuse to undertake, let us

*Read at the Thirty-ninth Annual Meeting of the Association held in Indianapolis, October 29-31, 1928. A portion of this paper was read by the author before the second Congress of the Medical Services in Canada.

say, a serious major operation when they have not had the training which would qualify them to undertake such responsibilities. We must admit, with regret, that these responsibilities are occasionally assumed by the unqualified with disastrous and even tragic results.

General Surgery as a Specialty

Consider for a moment the status of general surgery as a specialty today compared with the conditions which formerly existed. Early in the fourteenth century, the Barber surgeons were legally recognized in England, and a few years later the "Guild of Surgeons" was instituted and became a rival of the Barbers. Throughout the greater part of the fifteenth century, the Barbers seem to have had control, until, in 1540, the two companies were united by Henry VIII. The united company was authorized to appoint four masters or governors, "two to be surgeons and two to be barbers." Barbers were forbidden to perform any surgical operations, except the drawing of teeth, and surgeons were not to exercise the craft of barbering and shaving. From these primitive beginnings, and after various vicissitudes, in 1800 the Royal College of Surgeons in London emerged, which, under a new charter in 1843, changed its name to the Royal College of Surgeons of England.

Surgery and Anatomy

The teaching of surgery was linked with that of anatomy. This was the earliest association, as quaintly stated in an edict of the Town Council of Edinburgh in 1505, which provided that there be handed over "anis in the yeir ane condampnit man after he be deid, to make anatomea of, quairthrow we may heif experience, ilk ane to instruct utheris, and we sall do suffrage for the soule." A similar enactment in England gave the company the right to claim four bodies annually of persons executed for felony.

The first inclusion of surgery in the medical curriculum again illustrated its association with anatomy. In Edinburgh during the first half of the eighteenth century the first Monro gave "a few perfunctory lectures at the tail end of the course in anatomy, the professor himself was not even a practising surgeon." In 1776 Monro secundus successfully opposed an attempt to create a professorship of surgery in Edinburgh. It was not until 1831, after the three Monros in anatomy had monopolized the university teaching of surgery for 110 years, that the Crown, on the recommendation of the Town Council, established a separate chair of systematic surgery and appointed John William Turner its first incumbent (Miles).

Status of Surgery

During the past one hundred years surgery has gradually come to occupy a position, on the curriculum of study, of equivalent status to

that of other clinical subjects. Fifty years ago the field of surgery began to extend its limits and, because of the genius of Lister and his monumental contribution, today there is no region of the body which is delimited from the surgeon's skill. The technique of surgery has become more and more complicated with the result that once more we have specialties within a specialty. Take for example the surgery of the brain and spinal cord, as one of the more recent subsections of surgery. In our large schools we are training men for this very delicate work, and the general surgeon recognizes that, without very special training, he is not competent to operate upon brain tumors, etc., with the skill and efficiency which is due to the patient.

Training of General Surgeon

Let us, however, for a moment consider the training of the general surgeon. His services are in demand in all parts of the country and as our hospitals multiply in smaller communities, the general surgeon finds increasing opportunity for work. In the evolution of the modern surgeon it appears essential that the ancient close association with anatomy should be maintained. Fifty years ago Billroth wrote a book on medical education which has recently been translated into English. He had a wonderful vision of the future and his writings are carefully studied, because his sane arguments apply with remarkable acumen to the problems of the present day. Regarding anatomy, Billroth makes this statement: "Surgery and anatomy have many points of contact, but they are not identical; one may be an excellent anatomist, and yet not have one iota of surgical skill." The truth of this pronouncement is apparent to all; but I am sure Billroth would with equal emphasis assert that "Surgical skill is of little practical value in the absence of an accurate knowledge of anatomy." The surgeon who is not a good anatomist is constantly courting disaster. A thorough knowledge of anatomy must be insisted upon as a necessary qualification to practise surgery. Equally important is an adequate training in surgical pathology and bacteriology.

Another requisite for surgery is a good knowledge of general medicine. Thirty years ago it was the custom to insist on a man conducting a general practice for at least five years before branching off into surgery as a specialty. Theoretically, the suggestion is sound, and, at the present time, one could cite examples of young men continuing in general practice who, along with their general practice, by hard, conscientious work, have succeeded in acquiring an excellent training in surgery. There is no better product in general surgery today. There are certain requisites necessary in such a conjunction of surgery with general practice. The man must do continuous work in a surgical ward of a general hospital and must, over a long period of time, act as first assistant to a good surgeon.

Training Surgeons for Smaller Communities

Unfortunately, the opportunity to act as assistant and to work, and possibly teach, in a surgical ward and laboratory, can only be obtained in a large city, preferably in a teaching center. This, therefore, does not solve the problem for the training of surgeons for smaller communities. In some of our schools we have endeavored to solve this problem. Briefly stated, it consists of postgraduate instruction and experience extending over three years: one year as intern, in a rotating service in a general hospital; two years devoted to surgery, while at the same time carrying on work in the laboratories approved by the Department of Surgery. The rotating service, if the man takes full advantage of his opportunities, gives him, in an intensive fashion, something equivalent to the period of general practice which has been recommended. A knowledge of laboratory methods as applied in surgery is particularly valuable to one who is to be cast upon his own resources in a small community and finally two years devoted wholly to surgery in the wards and laboratories of a general hospital will give him an opportunity to develop the necessary confidence and skill to carry on as a specialist. If the individual is proceeding to a higher degree in surgery at the University he will be required to pass examinations in anatomy, physiology, pathology and surgery.

We are told from time to time that bad surgery is done and unnecessary operations are undertaken. The general public will rectify, eventually, that state of affairs where it exists. The public will demand, at present they are demanding, a knowledge of the qualifications of anyone who undertakes to do surgery. In medical education, however, we should take the initiative and anticipate the demand of the general public by providing the machinery by which the general surgeon may be trained to do this special work efficiently.

There are certain bodies in this country which endeavor to "establish a standard of competency" for specialists who, after having attained the necessary standard, may be admitted a fellow of a college and thus receive the imprimatur of that college as one fully qualified to practise his specialty.

Preliminary Training of Surgeon

The objects arrived at by these institutions are praiseworthy in so far as they succeed in determining beyond all doubt the competency of the individual for his specific work. On the other hand, we, in the medical schools, are mainly concerned in the preliminary training of the specialists. I have a somewhat intimate knowledge of the American College of Surgeons, having served for some years on the Board of Regents. That body grants its diploma to a man after he has "arrived" so to speak. For example, one condition of fellowship is that he must "submit in complete detail the case records of fifty consecutive

major operations which he has performed himself." It is not difficult to see that an individual may be tempted to acquire his skill by practising on the public until such time as he is able to produce fifty consecutive cases demonstrating a sufficiently high standard of efficient performance to warrant admission as a fellow. Personally, I am convinced that the preliminary training of a surgeon is of paramount importance and should be insisted upon. It is essential for the progress of surgery in this country that a man should be required to undertake intensive training, essential for the efficient practice of surgery, prior to his entering the field of the surgeon who practises his art independently in the community. Adequate tests by examinations should be required when this preliminary training is completed.

The preliminary training to which I have referred should include special studies in anatomy, physiology, biochemistry and surgical pathology. One would also include effective training at the bed-side in diagnosis, prognosis and the indication for treatment, and the after treatment.

Importance of Surgical Pathology

I fancy we all recognize that there is a tendency to rush into surgery without this background of preliminary training. The operating surgeon imperfectly educated in these essentials is a menace to the community. Take, for example, surgical pathology. I fear a large percentage of our surgeons today know little of the histology of morbid tissues or the significance of morbid processes as studied by the pathologist. In the absence of such knowledge the surgeon is incapable of practising his art with the degree of efficiency and good judgment which should be demanded of him. I hold that it is unfair to the coming generation of surgeons that we should permit them to proceed in their vocation without demanding a working knowledge of surgical pathology as a necessary part of their training. Many a good man finds himself severely handicapped in his practice because he had not been required to acquire a knowledge of this subject in his preliminary studies. Such a one is very apt to blame his preceptors because they had not insisted upon intensive work in surgical pathology at a stage in his career when he was able to devote his time to it.

Duty of Medical Schools

Similar observations might be made regarding other features of the preliminary training. It is, therefore, in my judgment the duty of our medical schools to provide suitable training for those who wish to devote themselves to special fields of work in medicine and surgery.

The object of this paper is to insist that the university should shoulder the responsibility of providing adequate postgraduate courses for the training of those who wish to enter upon a special field of practice in medicine or surgery. This duty is imposed on the university

because it is essential that the specialist should have the background of a thorough training in the basic principles of those sciences which form the very foundation of his specialty. The individual who has enjoyed this preliminary training is adequately equipped to enter upon his work as a specialist, subsequently he undertakes his special work in practice, and having acquired the necessary technique, he is capable of rendering the highest type of service to the public.

Discussion

DR. HUGH CABOT, University of Michigan: I find myself very much in accord with Dr. Primrose in this matter and simply want to point out one thing, in addition to what he has said, which seems to me is important. He probably delimited his subject to general surgery. All of us, I think, in his position are under pressure to prepare men for further sub-specialization in surgery. It has not, I think, been sufficiently insisted that the sub-specialties of surgery must be based upon a knowledge of general surgery.

For some years we have offered a course similar to that suggested by Dr. Primrose, of three years, for preparation in general surgery. We have insisted that those who wish to go into the further subdivisions take an additional two years. The only subdivisions in which we have been in position to offer work are those of neurology, bone and joint surgery, and urological surgery. In those three divisions we have insisted that men have a complete three years in general surgery before they undertake to further specialize in the subdivisions of surgery.

I have a strong feeling that in the subdivision with which I am most familiar, that of urology, grave criticism might be made of the urologist on the ground that he never was a surgeon, that he undertakes to do surgery, or has undertaken to do the surgery on a certain portion of the body, without being properly grounded in surgery. I think in the past, at least, the same criticism has been properly applied to what was generally known as orthopedic surgeons; they were not soundly grounded in general surgery.

We are now well advised in insisting that they should have a broad general surgical foundation before they undertake to specialize. Otherwise, I am very much afraid they will overplay their hands in their specialties and see their field through narrowly, improperly focused glasses.

DR. N. P. COLWELL, Council on Medical Education and Hospitals: This paper is in line with progress being made in the proper recording of the training in the specialties. Opportunities for such training are being constantly increased through the development of graduate medical schools. Hospitals, also, in increasing numbers, are providing higher internships—better referred to as residencies—in which the graduate spends one, two or three years beyond his regular internship in the line of his chosen specialty.

Statistics in regard to the number of physicians who obtain advanced graduate study have been published on two occasions. Figures showing the total number of graduate students during 1922 were published in the report of the annual conference of the Council on Medical Education held in March, 1923. Statistics regarding the graduate medical students enrolled during 1927 were published in the educational number of the *Journal of the American Medical Association* of August 18, 1928. These statistics included not only the students enrolled in the graduate medical schools, but also the physicians who had completed residencies in certain specialties in the approved hospitals in the United States.

Arrangements are being made in the headquarters of the American Medical Association for recording the graduate courses so completed. On the individual physician's card included in the biographical index of all physicians, a special line has been provided for recording the graduate work completed by each physician as well as the amount of such work and the subject taken. Reports are being regularly sent to us by the graduate medical schools showing the physicians enrolled each year, the subject taken and the length of the course. Similar information is being sent to us by all hospitals listing not only the physicians who have completed their general internships, but also those who have taken one or more years as residents, giving also the specialty selected. These reports are coming in better every year. Information of that sort is gradually accumulating so that as time goes on an increasingly accurate record will be kept of such work.

We need more graduate medical schools. We need additional opportunities for residents in hospitals. The number of hospitals thus far which, after investigation, have been found worthy of being approved for residencies is rather small. Our list is still imperfect and doubtless other hospitals deserve to be included. With the reports being regularly received for the American Medical Directory, of both interns and residents, the records will accumulate so that before many years it can be known with a fair degree of certainty whether a man who poses as a specialist has actually obtained the needed essential training.

In recent years a supervision has been established over clinical laboratories and an approved list has been made, but more important than approved laboratories would be a complete list of pathologists who are properly trained. If this is known, it matters little whether his laboratory is private or in a hospital; the character of his work will be assured. A similar effort is being made to secure a list of properly qualified roentgenologists.

The trend is to secure complete lists of those who are qualified in each of the various specialties, and toward this end a record is being kept, not only of the undergraduate training of each physician but also of any work taken toward specialization.

DR. L. S. SCHMITT, University of California: At one of our previous meetings, Doctor Wilbur said that it was about time to kick the specialties upstairs into the graduate school; this paper indicates a healthy trend of events. This trend will also serve to relieve the congestion in the undergraduate medical curriculum. It would be a further step in the right direction if, with the cooperation of licensure boards, we would transfer the teaching of orthopedics, surgery, urology and some of the phases of therapeutic surgery to the graduate school, so that a graduate would not be permitted to perform major surgery the day after he is licensed to practice, unless he is adequately prepared.

DR. LOUIS B. WILSON, University of Minnesota: Mr. Chairman, the members of the Association might be interested in the experience of the University of Minnesota in the training of surgeons.

As most of you know, we began thirteen years ago the training of specialists in medicine on the university basis. Candidates are selected from a very large number of applicants. They are graduates of good schools and average a little more than two years of hospital and laboratory training after graduation before they come to us. They are with us not less than three years and not more than five years. They average forty-seven months of actual training with us.

In the early years we experimented with men with a great variety of pre-

liminary training. The diagnostic work which they have done with us, for the most part, has been with complicated cases. The work has been a difficult test of the men's ability. Careful quarterly records have been kept of each man's skill. From our experience we have formed very definite impressions which are indeed more than impressions in that they are based on accurate data. For example, we are certain that the better a man's training has been in the fundamental branches of anatomy, physiology, physiologic chemistry, and pathology, the better are his chances of "making good" with us in clinical fields. We are convinced also that there is seldom, if ever, a man who has just graduated from a medical school who is sufficiently grounded in all four of these fundamental branches to warrant his omitting further intensive study in one or more of them while preparing himself for the practice of any special field of clinical medicine. The commonest serious defect in graduates of American medical schools is in their postmortem experience. We might profitably follow more closely the traditions of continental Europe in this respect.

The hospital experience of the candidates for graduate training in surgery is too apt to be focused too early on operative work to the neglect of pathology and diagnosis. The influence on the young intern of a brilliant operator on the hospital staff is often unfortunate in that it leads the young man to view surgery as merely operative procedures.

Rural general practice alone, so often advised as preliminary to specializing, we believe to be of doubtful value as a preparation for clinical specialization. In fact, most men who have been in rural general practice alone for five years or more are apt to have lost that keen mental edge so necessary for attacking the problems in the fundamental medical sciences which they must solve if they are to make that material progress which will raise them to the level of consulting specialists. This, of course, does not apply to general practice in connection with hospital or teaching groups in which the young man's mind is kept sharpened by attrition with those of more experienced men.

I am delighted, Mr. Chairman, with this paper because it indicates a trend on the part of universities to recognize their responsibilities in the proper training of men for medical specialties. As a profession we can no longer shirk our responsibilities in this direction and these responsibilities may best be assumed by universities.

Dr. Alexander Primrose, University of Toronto: I will not argue with Dr. Wilson on the terminology. I only wish to say I thoroughly agree with him in the stand he has taken regarding the character of the course which the surgeon should have; and he should have a background of general surgery.

The thing I had wished to bring before this assembly today was, as Dr. Wilson has perhaps emphasized, the responsibility of the universities in this matter. I think we can do a great deal if we can persuade such a body as the American College of Surgeons, which is well established in this country, to insist upon a test in those sciences which are a necessary basis for the efficient practice of surgery, more particularly, anatomy, physiology, biochemistry, pathology and surgical pathology.

As I say, I am still a Fellow of the College, and if I disagreed with them entirely I would, of course, resign from that college. As a former member of the Board of Regents, I want to insist again that if the college would put on an examination in those basic sciences which the general surgeon should know, in the next generation the Fellowship would be of much greater value than it is today. That is my standpoint.

I also wish to pay tribute to the splendid work being done in the Mayo

Clinic, of which I know something, because many of our graduates from Toronto have gone there, and I know intimately what is being accomplished there. The training of the surgeon in that clinic is excellent.

I am interested to learn from Dr. Colwell that a definite attempt is being made in this country to determine what men are qualified to do surgery along the lines indicated in my paper. I believe that is really a splendid field for excellent work, and should result in something of considerable value.

Lastly, may I say I quite agree with Dr. Cabot in his attitude that the man should be trained in general surgery and subsequently in the specialties which require special knowledge. I am in entire agreement with him there.

Senior Electives at University of Tennessee

During the current school year the University of Tennessee College of Medicine is offering senior elective courses for the first time. The obvious purposes of the courses is to offer to students who, for nearly four years, have followed a curriculum prescribed for them with absolute rigidity an opportunity to select for themselves one month of training in subjects to which they are led by their own interest. In order to give the elective courses it has been necessary to rearrange the schedule of the senior year so that the students may have sufficient release from required work, and a considerable number of elective courses might be offered without seriously interfering with the routine of the hospital. These ends have been reached by first removing from the senior schedule all instruction in the minor subjects and then arranging the curriculum into eight periods of four weeks each. Two periods are assigned to medicine (including neurology and psychiatry), two to surgery, one each to pediatrics, obstetrics and gynecology, and one to elective work. The senior class in turn is divided into eight sections. Each section then takes each of the eight periods, but in a different sequence, that is, the sections take each period of instruction in rotation. In this way, each hospital service has its quota of clinical clerks throughout the year. We have so far organized elective courses in the following subjects: tuberculosis, diseases primarily affecting the blood, chest diseases, heart diseases, gastro-enterology, dermatology and neurology with special reference to syphilis, pediatrics, ophthalmology, otolaryngology, urology, orthopedic surgery, roentgenology, obstetrics and gynecology. It will be noticed that most of these are in the specialties of medicine and surgery. In the required curriculum we have cut down the time allotted to these subjects to a minimum and, consequently, the elective courses are here especially helpful as offering opportunities for students who wish to extend their information in these fields. The organization of each course varies in accordance with the ideals of the instructor.—HYMAN O. W.: *Southern M. J.*, 21:1046 (Dec.) 1928.

The Improvement of Medical Instruction*

M. E. Haggerty
Dean, College of Education, University of Minnesota, Minneapolis

Trepidation is an inadequate term to express the misgivings with which I accepted your secretary's invitation to a place on this program. I know only so much of the special body of knowledge in which you are scholars as an educated layman with some training in biological and psychological science could be expected to have. Should I attempt to discuss the detailed teaching problems which are the daily grist with you who teach pediatrics, I should be in danger of revealing the gross ignorance that disqualifies me for the task you have asked me to perform.

Your secretary was good enough to provide me with the reports of previous meetings of your Association with marked pages showing the discussion of teaching problems by the members of your own craft. These papers by Drs. Barbour, Wall, Brennemann, and Morse I have assiduously studied, and with a little review I can pass an examination on them. Thus I have sought to gain some familiarity with the task set me. One other claim I have. For several years I was associated as psychologist with Dr. J. P. Sedgwick in certain clinical work in the out-patient department of the University of Minnesota Medical School and in the University Hospital and thus had opportunity to observe his work with children and his teaching of medical students, and to share his fine scientific and humanitarian spirit. This far-off and secondary contact with the detailed problems of your teaching, much as I prize it, still leaves me puzzled as to whether I can bring you from the field of education anything of genuine value to you.

Cooperation in Instructional Research

There is, however, one conviction which I hope you share with me that encourages this attempt. More and more as one studies the problems of higher education it becomes increasingly clear that the solution of our teaching problems must be a joint enterprise of men trained in the techniques of educational research and of other men who are scholars in the fields of academic and practical knowledge. Educational science has something to offer to teachers in academic fields, not in the way of didactics and ready made formulae, but through techniques of investigation to determine what teaching methods are most effective and as to how teaching methods may be improved. Such contributions from educational experts, however, cannot supplant the knowledge and skill of the scholar in the teaching subject. The hope is that the two working together may do better than can either working alone, and through their cooperation teaching may be genuinely improved.

*Read before the Association of American Teachers of the Diseases of Children, June 12, 1928.

I should approach our present task, therefore, with better zest if it were conceived as a joint enterprise of investigation of the teaching methods most useful in your field rather than as a didactic lecture. I should feel much more at home with you if our common task were to set up an investigation into the methods of teaching pediatrics and if this hour were to be devoted to outlining the techniques of experimentation, the necessary control of variable factors, the measurement of results, and the interpretation of the findings. The experimental program is, I am certain, basic to genuine improvement in college teaching and something of what it implies you will, I hope, gather from certain illustrations to be given later in this discussion.

Criterion of Student Activity

Before we come to the reports of experimental work I wish to stress one principle of learning universally accepted by psychologists, but too frequently neglected by teachers everywhere. This principle may be simply stated about as follows: Learning is a product of the activity of the organism. This is true whether the organism is a paramecium learning the most economical method of turning in the restricted portion of a glass tube or a medical student learning to palpate the abdomen of a sick child. It is true whether the activity is that of the large muscles brought into play in learning to swim, or the hidden neural activity involved in the understanding of a chemical formula. It is the activity of the learning organism that counts in learning and not the movements that take place in his environment.

The Lecture as a Teaching Method

If we could but apply this principle accurately in estimating the effectiveness of teaching methods, it would go far to clarify our discussions. How useful is the lecture as a teaching method? The answer by this criterion forms a second question—to what active experience does it induce the student? When thus stated, no blanket answer of good, bad, or indifferent is possible. More than likely the answer would be differential. *Some lectures in some subjects by some instructors constitute an effective method of instruction for some students.* The measure is not what the instructor does in the process of teaching, but what the student does as a result of hearing and seeing the lecture. Does he hear? Does he see? Does he give unified attention? Does he get new facts? Does he understand them? Does he think about them? Does he feel a thrill of pleasure in new facts and new insights? Does he go out from the lecture stimulated to read, to experiment, to ponder? If we could know the degree to which these things occur in the student we should have some measure of the value of the lecture. It is not what happens in or to the lecturer that is important. His voice, his appearance, his scholarship, his command of language, his techniques

of explanation or illustration have their total value in the reactions they evoke in his listeners.

The failure to keep this principle in mind and our unwillingness to support our practices with quantitative data objectively determined allow us to hold many unverified opinions about teaching procedures and probably some that are highly erroneous. This problem of the lecture method is a case in point. Diametrically opposite views are to be found in the literature and a respectable lawyer's brief could be prepared for that side of the case upon which his own predilections happen to array an individual teacher. The argument could be supported by copious citations from the writings of men whose prestige in teaching gives them a halo of authority. To be sure, such a brief, interesting and to some extent useful, could give no scientific determination to the vexed problem. It would, however, carry sufficient weight to commit many individual teachers to one or the other side of the issue, and to be made the basis of administrative policies involving large expenditures for buildings, operation and instruction, as well as the welfare of students.

Large Classes versus Small Classes

As a matter of fact, my attention has recently been called to the programs of two competing professional schools, not medical schools, which represent fundamentally disparate policies on an issue closely related to this question of the lecture method. Both of these schools have a long and creditable history; both are facing a program of expansion involving large expenditure for new buildings and increases in instructional staff. One of these schools is basing its development upon the theory that students must be instructed in relatively small groups. Its new buildings are planned with many small class rooms and its budget must necessarily reflect this administrative policy. The other institution is proceeding upon the belief that effective instruction by the lecture method is possible with groups as large as 400 or more. The character of its new buildings reflects this view and its budget will be determined by it.

Whatever grounds of belief regarding effective instruction actuate either of these institutions, and doubtless each could present an apparently cogent argument in defense of its program, it remains true that neither of them is in possession of an adequate fund of verified facts to justify its policies, very little of the kind of scientific information that lies at the basis of our control of many human diseases. The limited experimental studies bearing upon the matter would seem to support the policy of large lecture classes and the burden of proof would apparently fall upon the proponents of small group instruction. The meagerness of available data, however, does not permit generalization, though studies by Professor Hudelson and others render it impossible for the believers in small class instruction any longer to determine institutional

policies by argument alone. They are now under the necessity of producing a body of factual knowledge to support their beliefs and to show that something happens in the small class student from which the large class student is immune.

College instruction cannot be delayed until all our teaching problems have been resolved by experimental methods, but a clear perception of and application of this criterion of student activity would go far to correct many of the cruder delinquencies of college teachers. It might also curtail the dogmatism of some of the devotees of certain methods. If the teacher would only ask himself the question what happens to my students when I do this or that particular thing, he would have assumed the initial attitude necessary to the good teacher and would have accepted a necessary criterion for the evaluation of instructional techniques.

Knowledge and Forgetting

Let us now turn to a very different type of instructional problem, that of prerequisite knowledge.

Effective instruction in medical subjects is conditioned upon the possession by the student of much previously acquired information and of many learned skills. In this respect it is akin to all professional education and unlike educational processes at a lower level where there are few, if any, prerequisites except general intelligence to efficient learning and instruction. The amount and detailed character of such information, however, seems much greater in modern medicine than in any other field, thanks to the amazing developments of technical science in the last century. If the prospective medical student could intelligently appreciate the volume of intricate facts and principles he will be called upon to master, he might well be appalled and deterred from proceeding further. The medical curriculum has laid tribute upon the wide realm of the physical and biological sciences, not omitting mathematics, and has added thereto the modern languages by way of preparation. It embraces in addition all the multiform abnormalities of the human organism as the arena where the student's knowledges and skills are to be exploited. To see the simplest collection of books representing the medical curriculum, to sense the endlessly accumulating body of detailed facts they represent, and to realize the vast laboratories from which they have and ever continue to arise is to become aware of an herculean intellectual task set for the medical student.

One marvels that any individual ever becomes the master of even the basic core of information which these books and the libraries they represent contain. To be sure most of the human race do not and apparently are precluded from the possibility of doing so by the limitations of their intellectual endowment. Among those who have earned the right to medical school matriculation by a certain proficiency in premedical courses there are wide levels of attainment in medical subjects,

and some students, no doubt, fall short of even the minimum achievement desirable in a medical practitioner.

Process of Learning

Notwithstanding the apparently gigantic intellectual task which confronts the medical student, it must be admitted that we have done but little to examine the processes of learning at this educational level with the methods of science and we have but little dependable data upon which to base a scientific technique of medical instruction. Yet the processes of learning are as clearly subject to scientific study as are the processes of disease and we can hope in time to create a scientific medical education just as certainly as we are creating a scientific medical practice.

In our eagerness that students acquire the content of our courses of instruction, the facts and principles that we set before them, we college teachers are prone to overlook the fact that forgetting is quite as normal a process of the human mind as is the fact of learning itself. Even with the best of intention and without derilection as to study habits students find it impossible to retain all that they read or hear and for the moment acquire. The peak of attainment which characterizes the assiduous student at examination time is always much higher than it is at any subsequent period, so easily does nature surrender impressions of a complex and slightly imbedded sort. The facility with which learned material slips away we find it hard to realize and our teaching proceeds as if learning without forgetting were the whole of the educational process.

Although the phenomenon of forgetting is of the deepest moment to educational procedure, it has been given but little scientific study and almost none at the college level. As a consequence we blunder in our methods and our judgments, blindly striving against natural forces that we should make our allies, or, at least, not treat as perverse enemies. One of the commonest results of our ignorance is the tendency to expect that students remember far more than they do from the courses which they have previously studied. We proceed with course X as if the student were really in possession of the material which we assume was given in course pre-X. In time we discover that this is not the case and then realize that much of our own instruction has gone astray because of our false assumption. Again, in our own teaching we fail to realize how little that we offer the student he will really acquire in any permanent form because he will forget our instruction just as he did that of the instructor who preceded us. Some appreciation of this phenomenon we should all have and some objective knowledge concerning it should be accumulated in reference to all our courses. A small contribution to the problem has recently been made by Mr. Palmer Johnson, one of our graduate students in education at the

University of Minnesota. With his permission I shall present certain of his data at this point.

Nature of Prerequisite Courses

The problem upon which he has been working is one of the nature of prerequisite courses. Specifically he has been investigating the relationship of courses in elementary botany to sequence courses, particularly to courses in agriculture and in forestry. As a part of this study he has found opportunity to study the permanence of learning in elementary botany. The Department of Botany has for some time been measuring the achievements of their students by means of objective examinations given as the final examination at the close of each college quarter. For the year 1926-27 the total for the three quarter examinations amounted to 587 different test items. These items covered, as did the content of the course, the subjects of comparative morphology, histology, algology, cytology, morphology of flowering plants, mycology and physiology. The test items were in the form of true-false and completion questions.

From among these 587 test items Mr. Johnson selected 265 items for a re-test examination to be given to the same students at the opening of the fall quarter of the year following that in which they had taken the course in elementary botany. By very careful and somewhat elaborate statistical studies he determined the measuring value of each of these items and combined them in an examination of two hours length. The students to be tested were to be found in sequent courses in forest mensuration, silvics, agricultural biochemistry, phytochemistry, soils, fruit growing, principles of genetics, plant pathology and farm crops. Between the time of the re-test and the dates of the initial examinations there had elapsed, 3, 6 and 9 months for the several parts of the test. The study sought to give answer to the question, "How much of what students know on a final examination in elementary botany do they retain for a period of 3, 6 and 9 months?"

All of us would expect considerable forgetting over time intervals as long as these, but few of us are prepared to learn that the loss of knowledge is as great as it is. The mean score at the close of the course was 207.4 points; three months later the same students scored 117.3 points, thus suffering a loss of 43 per cent of what they knew at the end of the course. For another group of students the end of the course score was 141.8 and six months later it had dropped to 74, showing a loss of 47.8 per cent.

By the further courtesy of Mr. Johnson I offer here two figures graphically portraying these results. The first gives for each of twenty-four students a picture of what he was able to do by way of immediate recall, the upper bar, and the lower bar his reduced attainment after the lapse of time.

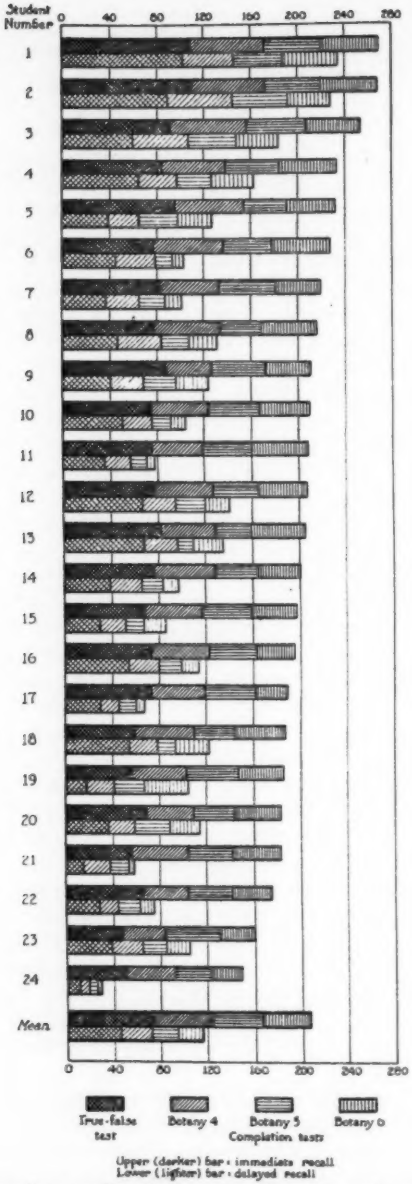

Fig. 1. Immediate recall and delayed recall scores on botany test 4-5-6 (24 cases. Test for delayed recall given 3 months after completion of course).

The second figure gives the median scores and interquartile ranges on the 265 item examination for pre-test, immediate recall and delayed recall at 3, 15 and 27 months after completion of the one-year course in elementary botany.

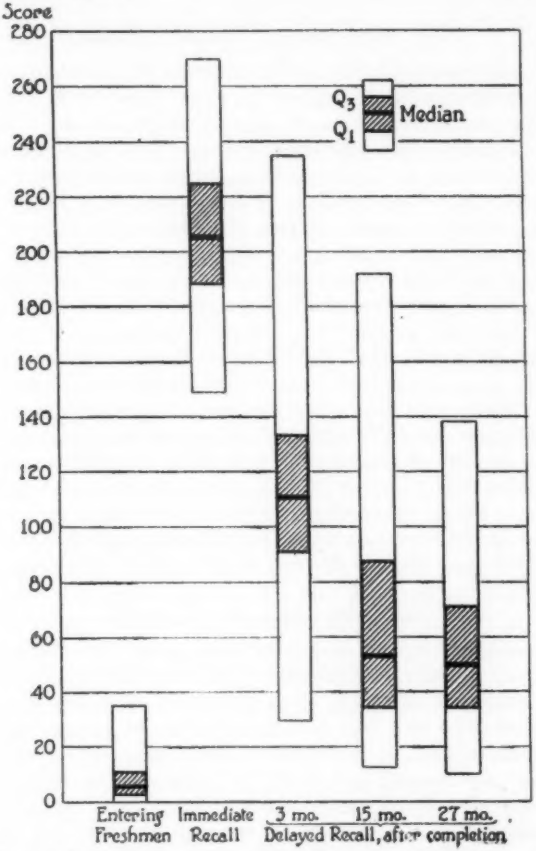

Fig. 2. Ranges, interquartile ranges and median scores on botany test 4-5-6 of students at various intervals after completing general botany 4-5-6.

Thus, it appears that the normal retention of the amount learned in elementary botany is but little more than 50 per cent. Almost half of the hard earned acquisition has disappeared within a period of from three to six months. In interpreting these data it must be borne in mind that the students tested had elected botany and had elected to do their major college work in fields for which botany is regarded as a

genuine prerequisite. They can hardly have been taking it as an indifferent means of earning college credits. We may, therefore, presuppose as real an interest in the subject as college students are likely to show in any beginning course.

How Much Should Students Remember

The data reported in Mr. Johnson's study are too restricted for any broad generalization in the matter of college instruction, and it is due him to say that he offers no such escape from the laborious task of further investigation. The substantial character of what he has discovered is of sufficient moment to give us pause in some of the assumptions commonly made by college teachers. You are teachers of the diseases of children. What do you expect your students to know of anatomy and physiology when they come to your course? What do you expect them to know of physiological chemistry or pharmacology or pathology? Have you any reason to believe that your assumptions are justified by the facts or that they are even in reasonable conformity to the essential nature of the human mind in learning and forgetting aspects? What guarantee do you offer that what students learn from you of the diseases of children will become a permanently useful bit of knowledge or skill? Are you reasonably certain that you are not making assumptions of knowledge too great and thereby lessening the effectiveness of your own teaching? The obvious reply to all such questions is the admission of ignorance unless you possess some power of divination withheld from the mass of college teachers, or unless there are researches in the literature which I have been unable to locate.

Over-Learning a Preventative

One safeguard against forgetting is the practice of re-learning and over-learning commonly employed by good teachers in all the fundamental processes of education. It is not enough that a student give just sufficient attention to a fact or a bit of skill that he may reproduce it on examination day. A fact which hovers just above the threshold of memory at one moment will likely be below that threshold in a few hours and much below it in the course of a few days. If the fact is to be irrevocably fixed in memory, it must be brought back again and again through a long period of time, re-learned, if necessary, and over-learned certainly, lest it subtly steal away from the grasp of the all-too-plastic nervous system.

Some of this re-learning is obviously the business of the instructor who first presents a fact to a student. If the fact is genuinely important then he must guarantee to the student the possibility of repeated and frequent contact with it. It is his obligation to set the instructional stage so that the essential repetitions shall occur. It is not enough, for instance, that the teacher of anatomy shall present the essential facts

of body structure through the lecture and the laboratory. He must provide for the repetition of these facts until they are wrought into the memory of the student so that the lapse of time will not efface them.

Just here I would say a word concerning the distributive obligations of instructors in sequential courses. A very common plaint of instructors in the later courses of a sequence is that students are illy furnished with the assumed contents of previous courses. I sometimes wonder that this type of criticism is so often in the reverse order, for in the field in which I am more at home than in that of medical instruction, the judgment would seem quite as reasonably to lie in the opposite direction. The implication is all too frequent that the instructors in these prerequisite courses have done their work badly. This may often be true, but may it not also be true that the instructors in the later courses have an obligation that stretches backward to courses previously taken? Thus, it is not fair to expect that teachers of pediatrics will utilize in their instruction all that the teachers of anatomy, and physiology, pharmacology, pathology, zoology, chemistry, physics, and mathematics have labored to provide the student of pediatrics. Unless the teacher of pediatrics calls up in his instruction all the rich body of factual knowledge and principles taught by the laboratory courses, it will, of course, have been taught in vain. To put the matter differently, the teaching of anatomy is not the business of the instructor of anatomy merely. To be sure his is the initial task, but the successful fruition of anatomical teaching is the work of the whole series of instructors whose contact with the student follows his. Re-learning again and again the essential facts of anatomy in varied and changing contexts, the student may come in time to be their master, his knowledge the outcome of many instructors through several years.

Economical Use of the Laboratory

Let us again switch our discussion to a still different type of problem —the use of laboratory instruction.

Natural science has made one revolutionary contribution to educational technique, namely that of laboratory instruction. The basic contention which has created this new method and shot it through all the teaching of science, and even into realms beyond, is the argument that students must have actual sensory contact with the phenomena about which they would learn. They must see and touch, smell, hear and manipulate the tangible data they seek to understand. In the growth of this method the tools of scientific research used by scholars for the investigation of new materials have been made into instruments of instruction for the beginning or partially trained student. Consequent upon the extension of this teaching method it has become necessary to multiply scientific instruments. Instead of a few microscopes or test tubes for the scholars of the institution we have purchased hundreds of

microscopes for novices who must learn to use them. Throughout all branches of natural science this process has gone forward, necessitating the erection of new and specially designed buildings and the accumulation of great quantities of scientific apparatus. Along with this development we have extended the time during which students are under faculty tutelage. The one-hour recitation has changed to a two-hour laboratory period, and one lecturer has been supplanted by numbers of instructors, laboratory assistants, storekeepers, technicians, instrument makers, and other necessary helpers.

The expansion of laboratory teaching has greatly increased the costs of providing education for large numbers of students and curiously enough this expansion has gone forward with but little question as to its instructional merit and almost no effort on the part of educators to evaluate it. There will be few, if any, to deny the soundness of the basic principle of laboratory instruction, but through the years the use of the laboratory has undergone many changes. It has been introduced in new fields, expanded in some, decreased in others, and in some cases all but discontinued, but we have no exact data to show exactly what students derive from it that could not be equally well obtained from less expensive modes of teaching. We believe the time has come to inquire more specifically than has yet been done as to the exact values to be derived from the laboratory.

Already there are some attempts making in this direction. At Minnesota we have made beginnings in elementary chemistry, elementary physics, and in anatomy and in physiology. The technical set-up for the experimental determination of the values of laboratory instruction are not easy to provide. The variable factors are many and intricate, and it is necessary to proceed gradually to crucial situations, resolving the total problem by the process of attrition. Even so, the progress thus far made is encouraging that adequate experiments may in time be developed.

Since the subject matter lies more closely to the interest of this group than does that of any of the other fields studied, I will give in its main outline the experiment in the teaching of human physiology. This study is the work of Dean E. P. Lyon, Professor F. H. Scott and Dr. A. W. Hurd. It was carried on in the fall quarter of 1926. The specific question raised related to the possibility of the substitution of library reading for laboratory practice. The stated laboratory requirement was seven and one-half hours per week in addition to the work in lectures, five per week, and quizzes, two per week. In the experiment one section of students was given a laboratory schedule reduced by one-third, or two and one-half hours. They were to have five hours in the laboratory and the additional time, two and one-half hours, was to be spent in library work. The control section were to proceed with the regular seven and one-half hour laboratory schedule.

"The plan of the experiment was to keep all factors of learning over which the school had control constant in the two sections, the only difference being the substitution of the two and one-half hours of library work for an equal amount of laboratory work. Identical lectures were to be given to both sections; the quizzes were to be given to reverse sections at the mid-quarter so that each would spend half the time with each section; the laboratory work of both sections was to be supervised by the same two instructors together; the library work was to be directed by another instructor, the work bearing directly on the work in physiology. The plan adopted for the library work was as follows: A list of topics was made up, from which list each student in Section B drew by lot for his assignment. Each student was to prepare a talk on his topic to be given before the class.

"In order to equate the sections A and B, two psychological tests were given the first day of the quarter to all members of the sophomore class. The tests chosen were the Miller mental ability test for graduate students and the sigma X reading test. The number of honor points gained by each student during the freshman year based on a total of 39 credits in anatomy, histology, and physiological chemistry were also computed. For sections A and B, students were selected who were very nearly comparable in the Miller test and in the number of freshman honor points gained. These two criteria were judged to be of most value in pairing the students, though no data were available to verify this judgment. It may be noticed that these two ratings of paired students are not identical, there being small variations allowed. If possible, a slightly higher rating of a paired student in one was counterbalanced by a lower rating in the other.

"It was found possible by this method of pairing to get but 22 students in Section A paired with students in Section B. Later this was reduced to 20 by changes in enrollment. The final roster of sections A and B was 32 students in each section, 20 of them being paired, the remaining 12 being selected at random.

"As further means of evaluating the equation of the sections, the average honor points of the students in the required subjects of their premedical courses were obtained. In comparisons made, it was thought wise to attempt comparisons, not only of the paired students, but of all the students, considering them as groups."[1]

If we may believe that the two groups of students are of equal ability to pursue the course and that the procedures for the two sections are identical excepting for the difference in laboratory work, then it should follow that the differences in resulting achievement would be due to the variation in laboratory procedure. Careful effort was made to secure objective and accurate measures of achievement.

"The ratings used are as follows: a mid-quarter objective test consisting of 70 true-false and 55 uncompleted statement items; 125 in all; a final written objective test of 250 similar objective items; a term laboratory rating on the laboratory book handed in by the student, judged by the two laboratory instructors in conjunction; a final oral rating which was the mean rating given by any two of the four instructors which the student selected; a final laboratory mark, the mean estimate of two tests, a "set-up," and a "tracing;" and the mean of 19 five-minute quizzes given during the quarter.

"The total, as given in the tables which follow, is a composite made up as follows: each rating was reduced to a percentage system, representing points in a hundred; then each was multiplied by factors; the mid-quarter test

1. Hurd, A. W. Evaluations of Certain Methods of Procedure in the Teaching of Science at the College Level. Pp. 118, 119. Doctor's Thesis.

by 1, the final written by 4, the final oral by 1, the average of the five-minute quizzes by 2, the term laboratory by 1, and the final laboratory test by 1, to make a possible total of 1000 points. The total is thus seen to be points out of a thousand possible."[2]

Results of Experiments

The results of the experiment do not all point to the same conclusion. In the mid-quarter test, the five-minute quizzes and the term laboratory rating Section A, the one with seven and one-half hours of laboratory, makes a significantly better rating. In the total of objective scores this section also rates higher, but the differences are of doubtful significance. In the final oral examination the difference is in favor of Section B with but five hours of laboratory instruction. It should be further noted that when students in the two sections who were paired for equal initial ability are considered, there is only one significant difference in favor of Section A, and that is in the rating of the laboratory note book. While more than half of the paired individuals in Section A secured higher ratings than their paired companions in Section B, there were some in Section B who excelled their mates of Section B. Thus it appears that there are some students who do get more from the reduced laboratory period plus the library work than they would probably get from the regular schedule.

Notwithstanding the equivocal character of the results, it is clear that we have here a problem that merits further study by more exact methods. Time does not permit a report on the experiments in the other sciences. It may be noted in passing, however, that the results in the anatomy study which are much more clear-cut than the ones in physiology do call in question the almost universal practice of requiring the first year student to dissect the lateral half of the human body. This experiment employed the method of parallel sections, one section working two-to-a-body and the other working four-to-a-body. Reporting on this experiment a year ago Dr. C. M. Jackson said:

"While there are slight differences between the results of the various tests, the average grades, both preliminary and final, are practically identical in the two divisions. The differences in the means for the two-to-a-body and the four-to-a-body divisions are always less than three times the probable error of the difference, being therefore statistically insignificant. This was true for the 27 pairs separately as well as for the entire class (the figures for the latter only being given in Table XXIV).

"In the winter quarter the divisions were reversed, those who had been in the two-to-a-body section now being transferred to the four-to-a-body division, and vice versa. The number in the four-to-a-body division was somewhat reduced in the winter; but the results were the same, as shown in Table XXIV. No significant difference in grades was found between the two divisions."[3]

Since that date the students in the two sections have been followed into their subsequent courses in neurology, histology, and physiology,

2. Id. Pp. 127, 128.
3. Problems of College Education, Chapter XXXV. Univ. of Minn. Press. The Results of an Experiment on Methods of Teaching Gross Human Anatomy. C. M. Jackson. Pp. 446-448.

and careful measurements of their work in these subsequent courses have been made and the records of the two groups have been compared by means of all available statistical techniques. The final conclusion based upon all results as stated by Dr. Hurd is that "The original groupings of students in anatomy, in twos and fours, respectively, seems to have no effect in producing differences in the more advanced medical school courses."[4]

Improvement of Student Marks

Did the time at our disposal allow, it would be useful to show how the attempt to give experimental evaluation to teaching methods leads to the improvement of marking and rating devices. Probably the most serious handicap to research in the techniques of college teaching is the lack of statistically reliable measures of student ability and achievement, and we can make little progress in instructional research until we recognize this fact and set about its correction. Experiments in psychological and educational measurement have pointed the way to one such improvement, namely the so-called objective examination. Extensive use was made of such examinations in both the physiology and anatomy experiments and there were attempts to standardize other measuring techniques.

In passing, it may not be out of place to plead for a wider use of objective examinations in general teaching procedures. However we may decry the whole examination business, and admittedly it has many evils, teachers have found, as yet, no adequate substitutes for it. We must have meaningful information about our students, the knowledge they possess, the skills they acquire, and their capacities for further growth and efficiency. For this purpose we have used personal judgment and the traditional type of college examinations, both so demonstrably faulty and inaccurate that they should have been superseded long ago.

The objective examination, without doubt, affords a measure of improvement.

"The variety of form possible in such examinations makes them usable in widely varying types of subject-matter, and statistical techniques make it possible to describe them in terms of their reliabilities, validities, and other essential attributes. Many of these forms, such as the true-false, multiple-choice, completion, matching, recall, and analogy have had extended if not exhaustive analysis so that we know their possibilities and can use them with some assurance as to their meaning. If college instruction is in need of improvement, here lies at hand an instrument of great possible usefulness in the proposed endeavor.

"The proposal to replace the present unreliable examinations by objective measures of student achievement is here made without any illusions as to their limitations. That they are not perfect measures we all recognize, but that they obviate many of the defects of the present system is capable of demonstration by the same experimental and statistical techniques which have made the sciences of physics and biology grow from the older knowledge of natural

4. Hurd, A. W. A "Follow-Up" of Students in Anatomy, Fall 1926-27.

philosophy and natural history. They can be scored with an exactness and clarity not possible in the usual examination. The resulting marks are independent of the personal judgment and prejudices of the examiner. They are intelligible to the student and instructor alike and when consistently used they make possible comparative ratings in terms of large numbers of individuals pursuing the same courses in different years and even in distant institutions. By their use we can now give objective evaluation to the effectiveness of different curricula and varied techniques of instruction.

"The advocacy of objective examinations is a plea that education shall make use of the newly developed technique that through wide use in related fields are transforming the sciences of psychology, sociology and biology. In all these fields statistical methods have enjoyed extensive and fruitful development in recent years. Education is privileged to share in this progress and we should be as thoughtful and conscientious in the business of teaching as we are in that of biology and medicine."[5]

The consideration of objective examinations leads to a second suggestion, namely that colleges should do something to improve the technique of assigning marks to students.

"There can be little effective study of college teaching and little intentional improvement in it until we discard the present marking system, or supplement it with corrective devices that render it intelligible. More than twenty years ago it was clearly demonstrated that the marking system employed in most schools and colleges is statistically unreliable. Since that time scores of statistical studies have been made all confirming this fact. Notwithstanding the accumulating evidence, colleges have been slow to devise better methods and have for the most part declined to adopt the improved techniques recommended to them. So long as this situation prevails there can be no consciously directed improvement in college teaching and we are practically estopped from evaluating the results of our work just because we can not objectively discriminate good teaching from the inferior and the mediocre.

"Investigation has not revealed any complete panacea for the defects of present marking systems, but two methods of improvement that promise usefulness may be commended. The first is the percentile technique of recording student standings in examinations and courses, and the second is objective examinations.

The Ranking Method

"The ranking method of reporting student achievement has been long discussed and in one form or another has been frequently applied in practice. Spence's[6] recent discussion elaborates the principles underlying the relative marking procedure and suggests the basic techniques that would make it applicable to most situations. By it the instructor is set a much simpler task than he is now asked to perform in the assignment of letter or percentage grades. He is merely asked to rank his students in the order in which they have mastered the subject-matter of his course, placing first that one whose achievement is greatest and last the one whose achievement is least. The interpretation of such rank order distributions is a matter of administrative policy to be carried out in a central office by means of statistical techniques and in accordance with an institution's administrative policy.

"The advantages of the system are that whereas the present system presents the instructor with the impossible task of assigning meaningful letter or

5. Haggerty, M. E.: "The Improvement of College Instruction." School and Society, Vol. XXVII, No. 681, Jan. 14, 1928. Pp. 11-13.
6. Spence, Ralph B. "The Improvement of College Marking Systems." Teachers College Contributions to Education, No. 252, 1927.

percentage marks, the proposed method sets him a task that is within the compass of his ability to perform, and secondly, through the centralized interpretation of the record it becomes possible to equalize the marks from all instructors and departments and for all students.

"The proposed method has recently been adopted for trial at the University of Minnesota in the following form:

"For the purpose of further study of the marking system, the Committee on Education recommends:

"(a) That each instructor in addition to reporting marks by letters, as at present, shall report the rank of each student in his classes, such classes being understood to include all sections taking the same course during the same quarter. Whenever possible all sections should have the same examination.

"(b) That in classes of more than 100, the rank reported should be the percentile rank instead of the individual one."[7]

Improvement Through Educational Research

Earlier in the discussion I called attention to the place of educational research in the improvement of college teaching. I wish to return to this matter in closing, because to my way of thinking it is the most important contribution I can make to your important problem. As I read the several papers on the teaching of pediatrics by your distinguished colleagues, I felt a certain sameness, at least in method if not in content, with the ideas of our colleagues in other academic fields.

Here were the ever present questions of the place and the value of the lecture, the art of asking questions, the use of demonstrational material, the study of individual cases, the adaptation of subject matter and method to the abilities and interests of the student, the problem of pre-requisite knowledge, the scholarship of the teacher, his interest in students and his enthusiasm in teaching, the adequate provision of laboratory materials in outpatient departments, clinics and hospitals, the amount of repetition necessary for effective learning, and on through a lengthening list of like topics. Nor can one read these papers without sensing the rich personal experience out of which they have grown, and the invaluable suggestions of these masters of the craft for younger men whose teaching careers lie still ahead. Nor for a moment would I suggest that educational research could be a substitute for the riches of skill and knowledge which master teachers in all fields possess and use. No more useful experience can come to a young teacher than association with an elder man whose work with classes and with individual students is the fruition of rich experience wisely garnered and applied.

When I plead for research in teaching problems it is as a supplement to that body of knowledge which individual experience has so fruitfully contributed. Science has something to offer to the art of teaching quite as truly as it proffers aid to the art of medical practice, even though as yet its offering is largely by way of methods of investi-

7. Haggerty, M. E. "The Improvement of College Instruction." School and Society, Vol. XXVII, No. 681. Jan. 14, 1928. Pp. 6-9.

gation rather than in verified bodies of knowledge. In this field of educational research the past two decades have shown a remarkable activity and out of it have come certain dependable techniques of investigation, statistical and experimental, that are ready for service to interested teachers in many fields including that of the diseases of children.

Cooperative Efforts

At the risk of nauseous repetition may I again say that this is not a task which students of education however gifted and well-trained can solve for college teachers. The business of improving instruction in any field is primarily the business of the teachers in that field. The primary obligation to improve instruction in chemistry rests upon the chemists who essay to teach, and it will be the teachers of pediatrics who will improve the teaching of that subject. In this effort at improvement, however, such teachers can be greatly aided by cooperation with trained students of educational research. My plea, therefore, if you choose so to regard this discussion, is for a joint attack by pediatricians and educationists upon the teaching problems in your field. Our Minnesota experience is warrant for the feasibility of such a program. The experiments reported above came from just such cooperative endeavors and could quite as well, and possibly more suitably, have been presented by Dean Lyon, Professor Jackson, or Dean Freeman as by myself or the graduate students in education who have borne the burden of the detailed studies.

If this proposal is taken seriously and prosecuted through a period of years, attacking problem after problem in the analytic and detailed fashion necessitated by the requirements of scientific method, then we may, in time, give definite and objective validation to many of our teaching procedures which as yet rest upon the warrant of personal experience and individual judgment. In the process some of our most stoutly defended opinions will doubtless be shorn away as illusions, but in the end our teaching practices will be improved and ennobled and will become the fit compeers of the scientific techniques in the practice of pediatrics itself.

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The Indianapolis Meeting

The concensus of opinion of those attending the thirty-ninth annual meeting of the Association was that it was the "best" meeting to date. Perhaps it was. There are many reasons why it easily could be the "best." The attendance was greater than ever before. More than 125 persons registered. More member colleges were represented than ever before—sixty-seven. The meeting place was the most comfortable, cozy and inspiring one. And, to continue the use of superlatives, there can be no question that the discussions of the papers read were the most spirited and, according to the transcript, the bulkiest we have ever had at any meeting.

Why is all this? Because of the constantly increasing interest in the Association—its aims and objects; its influence in the field of medical education and medical teaching. Because it is being recognized with increased force that other organizations with allied interests have come to regard this Association as the one organization that holds an undivided interest in medical education and is, therefore, best prepared and most eager to be entrusted with its continued welfare. Furthermore, through cooperation with all other agencies working in this field, the Association has established a feeling of confidence which it is bound to merit further by performing its functions in the best possible manner.

It is becoming better known that the Association prides itself on being an advisor rather than a monitor; that whatever criticism comes from it is constructive and helpful. At least, that is the intent. That it encourages initiative, individuality, experiment, in order that its constituency may not become standardized to the nth degree and, therefore, fossilized. A careful, painstaking, nay, meticulous perusal of the constitution and by-laws will fail to disclose even a semblance of rigidity or attempt at standardization. And yet, the Association has aims and objectives that it is doing all in its power to conserve and bring to fruition.

It is these facts that account for the greater interest in the Association; for the increasing attendance at the annual meetings; for the freer and more extended discussions; for the larger representation from allied organizations. For instance, about 150 sat at the banquet board on Monday evening; nearly 100 delegates attended the executive session on Tuesday evening; four bus loads made the fifty-two mile trip to Bloomington on Tuesday, besides several private auto loads. Even on the third day the attendance at the meeting had not diminished appreciably; interest had not flagged. The adjournment was taken with nearly a "full house."

Of course, it was the "best" meeting.

The local arrangements were splendid. As stated above, the meeting places were entirely satisfactory. Never before have the delegates enjoyed the chairs so much. Only fireside chairs were provided. Stiff-backed, hard-seated chairs were not in evidence. The luncheons at the Riley Hospital on Monday and at Indiana University on Tuesday were excellent. Empty plates bore witness. To those in charge of these arrangements, we can only say, "Thank you." Empty words, but conveying a wealth of kindly feeling and appreciation of effort.

New Committees Appointed

On the recommendation of the Executive Council, the Association empowered

the president to appoint two committees: a committee on relation of training schools for nurses to the medical school, and a committee on intern relations. The first named committee is charged with the duty to study the responsibilities which the medical school faculties must assume for training schools for nurses.

President Myers appointed on this committee: Dr. Charles P. Emerson, dean Indiana University School of Medicine, chairman; Dr. A. C. Bachmeyer, dean College of Medicine University of Cincinnati and superintendent of the Cincinnati General Hospital (also an ex-president of the American Hospital Association) and Reverend Alphonse M. Schwitalla, dean St. Louis University School of Medicine and president of the Catholic Hospital Association.

The second committee is asked to study the relationship of state licensing bodies to the required intern year; the administration of it; types of hospitals which schools should consider adequate for intern training; what teaching is actually being done by them, and the breaking of contracts by interns, as well as such other matters as it may deem necessary to consider.

President Myers appointed on this committee: Dr. Irving S. Cutter, dean Northwestern University Medical School, chairman; Dr. E. P. Lyon, dean University of Minnesota Medical School; Dr. M. H. Rees, dean University of Colorado School of Medicine; Dr. Richard V. Lamar, University of Georgia Medical Department and Dr. William Darrach, dean Columbia University College of Physicians and Surgeons.

Both committees will, no doubt, welcome aid and suggestions in carrying on their work.

Time and Place of 1929 Meeting

The Association selected New York City as the place of meeting in 1929. By request of the other medical schools in New York City, the meeting will be a College of Physicians and Surgeons affair and will be held at the new Medical Center which was dedicated recently. This will give ample opportunity to the delegates to familiarize themselves thoroughly with the buildings, equipment and plans of this center.

The Executive Council has selected for time of meeting the last Monday, Tuesday and Wednesday in October, the twenty-eighth, twenty-ninth and thirtieth.

Multiple Representation at Annual Meetings

Each year a greater number of colleges send more than one delegate to the meeting. This year, sixty-seven colleges sent 93 delegates. Quite a number sent only one delegate; some sent two and three delegates, and a few sent as many as four. Such multiple representation, with annual rotation of membership, gives opportunity to faculty members other than the dean to become familiar with the business of the Association. New interests are aroused; old interests are revivified; good comes to a greater number; the good influence of the Association is extended more widely to the greater benefit of all those who have to do with medical education either as administrators, executives or teachers. Only nine member colleges were not represented at all. Those in attendance included college presidents, members of boards of regents, trustees, deans, associate and assistant deans, and members of faculties. Every one present was deeply interested in the business of the meeting. The discussions were participated in freely by many delegates.

Dr. Don R. Joseph

The obituaries of Dr. Joseph have emphasized his good work as a teacher of physiology, as an investigator in that field, as an administrator (associate dean) and as a student leader. All of these excellent qualities he had and for all of them we remember him gratefully.

But there is another very interesting and valuable power which Dr. Joseph exemplified in high degree. He understood building construction and design as he also understood the needs of medical education. He brought this rare combina-

tion to bear on the building program of St. Louis University with results which anyone who cares to go into the details will acknowledge to have been highly satisfactory. The two buildings erected in large part under his guidance are models of arrangement, economy, convenience, ventilation, lighting and general adaptability. Nor was he without a sense of beauty. While adhering closely to the economical program enforced by meager funds he managed to produce laboratories, corridors and lecture halls free from the impression of stark, blank utilitarianism common in some of the new laboratory buildings in other universities.

I commend the Medical School buildings of St. Louis University to any institutional or laboratory head who is planning new construction. Had Dr. Joseph lived I think he would have made a distinctive place for himself as consulting expert in medical school architecture.

E. P. LYON.

State Boards Remove Restrictions

On numerous occasions it has been stated, authoritatively and otherwise, that there is a strong tendency on the part of state licensing and examining boards, as well as by the Federation of State Medical Boards, to extent greater freedom to medical schools in the performance of their functions. It is felt that all high grade medical schools are actuated by only praiseworthy motives, namely to furnish the best medical training possible to carefully selected students who have had a sufficient premedical training to be able to extract the greatest benefits from their teaching. Furthermore, if there is need to change methods of teaching now long in vogue, experimentation should be encouraged, but no school feels inclined to enter on any course of experimentation so long as its procedure is dictated, in large part at least, by so-called state board requirements to which it must conform if its graduates are to be admitted to examinations for licensure. For many years these requirements have proven to be a great handicap and deterent to making any effort to develop new methods and procedures in teaching. However, light is beginning to break through this stygian darkness.

It was reported at the Indianapolis meeting by the secretary of the examining board of the New York Board of Regents, Dr. Harold Rypins, that that examining body has removed all restrictions as to the conduct of medical courses. That the only test henceforth will be the examination for licensure. Now comes word from Dr. H. M. Platter, secretary of the Ohio State Board of Medical Examiners, that his board has decided to liberalize its regulations by removing all prescriptions hitherto in force, leaving the matter of medical education and training entirely in the hands of medical schools. As to how well the job has been done will be determined by the results of the licensing examinations.

Western Reserve University School of Medicine has decided to take advantage of this opportunity to enter on experimentation by revoking all general attendance requirements. Individual departments must list with the dean any minimum attendance requirements that they may consider essential to their courses, and no attendance rules shall be enforced unless they are so listed.

It is felt that a rigid attendance requirement is disadvantageous, first by placing unnecessary restrictions on flexibility and individuality in courses, instructors and students; and, second, by placing undue emphasis on the ways and means, rather than on the objectives, of the courses. The only national requirement for passing a course being the proficiency of the student in the subject, attendance, as such, should only be counted if there are no more direct means of determining the proficiency of the student.

This experiment will be watched closely by every other medical school, and educators in general, because at first glance it would seem to give the student opportunity to do pretty much as he pleases, but, without a doubt, the instructors will see to it that he passes a satisfactory examination in each subject, written or otherwise, before credit will be given for the course. At any rate, it is an experiment well worth making, and Western Reserve is admirably equipped to carry it on.

College News

University of Pittsburgh School of Medicine

Extramural instruction was begun with the opening of the current college year. Each senior student is assigned for six weeks to work with approved practitioners, most of whom are located in western Pennsylvania.

Marquette University School of Medicine

A separate department of pediatrics has been organized with Drs. Mynie G. Peterman, professor and head of the department; Abraham B. Schwartz, clinical professor; Alfred L. Kastner, associate professor; Karl E. Kassowitz, assistant professor; Samuel H. Lippitt, assistant clinical professor; Henry O. McMahon, assistant clinical professor; George F. Kelly, instructor; Francis R. Janney, instructor, and Samuel E. Kohn, assistant.

Western Reserve University

Dr. Carl A. Hamann, since 1912 dean of the School of Medicine, has resigned. On nomination of the medical faculty, Dr. Torald Sollmann, professor of pharmacology, was appointed as his successor.

Dr. Hamann had asked to be relieved of the duties of dean in order to have fuller opportunity to devote himself to other duties, as professor of applied anatomy and clinical surgery in the School of Medicine, as visiting surgeon of Charity Hospital, and as chief of staff in the division of surgery of City Hospital. The completion of the program of the university medical center promises that the office of Dean of the School of Medicine will be certain to entail increased responsibilities and growing volume of work.

Additional land has been acquired, so that the site of the Western Reserve University Medical Center now consists of about twenty acres, continuous with the university campus. The new medical school buildings, provided by Mr. Samuel Mather, at a cost of $2,500,000, were completed in 1924. Maternity Hospital, and the Babies and Children's Hospital were completed in 1925. The new Rainbow Hospital for Crippled and Convalescent Children has just been completed. The Institute of Pathology, a gift of The General Education Board, is nearing completion, and will be occupied early in the summer of 1929. Contracts for the erection of the new Lakeside Hospital and the Nurses' Home for the entire University Medical Center, have been let and excavations have been started. It is expected that the new buildings will be in use by October, 1930.

University of Pennsylvania

The university is conducting a fifteen year campaign for about $45,000,000 for additions, improvements and endowment. One of the gifts since the campaign was undertaken in 1925 has been that of $250,000 each by the Rockefeller Foundation and the General Education Board for a laboratory of anatomy and physiologic chemistry, with the provision that the university raise equal amounts, which has been done. The laboratory has already been completed. It adjoins the present laboratory building at Thirty-sixth Street and Hamilton Walk. It is five stories high, contains anatomy and physiologic chemistry laboratories for students in the medical and dental schools and graduate school of medicine, offices, and research and seminar rooms. There is now under construction another building which will be known as the Martin Maloney Memorial Clinic of the University Hospital in honor of Mr. Martin Maloney of Spring Lake, N. J., whose benefactions made possible, in large part, its construction. The Maloney clinic will constitute the first unit in the modernization and expansion of the University Hospital, and will permit the concentration of several medical clinics. The building will house

the outpatient department of the University Hospital, a hydrotherapy and physical therapy department, small wards for special cases, the Pepper Laboratory of Clinical Medicine and the John Musser Department of Research Medicine. The sixth floor will house the Eldridge R. Johnson Foundation for Research in Medical Physics, for which Mr. Johnson gave the university $800,000. The purpose of the Johnson Foundation is to develop the relation of physical forces to biologic processes, just as has been done with regard to chemical forces in the elucidation of biologic processes. It is a pioneer in this field. Other clinics in the Martin Maloney Memorial building include cardiovascular, gastro-intestinal, thyroid, metabolic and diabetic, asthma, pulmonary and biometric clinics. The Robinette Foundation for the Study and Prevention of Diseases of the Heart and Circulatory System, for which Mr. Robinette has subscribed $250,000 and to which he will add a like sum, will work in the midst of these clinics, all of which are subdivisions of the outpatient department of the university. The Maloney clinic building will contain also a library, roentgen-ray department, pathologic laboratory, receiving rooms and administrative offices.

University of Pennsylvania Graduate School of Medicine

A gift of $100,000 for the purchase of a gram of radium and accessories for use in the treatment of cancer is announced. About $72,000 of the gift will be required to buy the radium and the remainder will go to expenses involved in research. The gift will make possible the treatment with radium of the neediest patient with cancer. The fund will be designated as the Louis J. Kolb Foundation for the Treatment of Cancer and Dr. George E. Pfahler, professor of radiology, will be in charge. The Kolb gift is the second which the university has recently received to fight cancer, Irenee DuPont having contributed $45,000 for cancer research. As a result of Mr. DuPont's gift the physicochemical conditions associated with the cancer state are being studied under the direction of a faculty committee, comprising Dr. E. Ellice McDonald, assistant professor of gynecology, William C. Seifriz, Ph.D., professor of botany, and Dr. George H. Meeker, dean of the graduate school of medicine.

The opening of the newly built and equipped Chevalier Jackson Bronchoscopic Clinic of the University of Pennsylvania is announced. This newest of bronchoscopic clinics, which has been designed by Dr. Jackson for his personal work, is a model headquarters for such work, as conducted by Dr. Jackson and his associated staff in the bronchoscopic clinics of the two great hospitals of the University of Pennsylvania (University and Graduate Hospitals.) The nonclinical portion of the teaching is done in the anatomic and research surgical laboratories of the University. Such teaching and related research constitutes a portion of the long courses, one to three years' duration, provided for physicians who desire studies in the whole field of otolaryngology.

The Graduate School of Medicine, however, has also taken the utmost care in providing a series of two weeks' intensive studies designed for otolaryngologists and surgeons who desire to profit by the best contact with Dr. Jackson and his associates in courses for specialists. The courses include about six hours daily of intensive study. The courses are limited to twelve registrants and are intended for qualified surgeons or otolaryngologists who desire an intimate view of this subject. The fee is $250, of which $25 is to be paid at registration and $225 at matriculation.

University and Bellevue Hospital Medical College

Faculty appointments: Mr. Homer N. Calver, Executive Secretary of the American Public Health Association, was appointed assistant professor of hygiene. Dr. Homer W. Smith was appointed professor of physiology. He was formerly professor of physiology at the University of Virginia.

Promotions: Dr. Webb W. Weeks from clinical professor of ophthalmology to professor of ophthalmology to succeed Dr. John Wheeler who resigned; Dr. Hubert V. Guile, from lecturer to clinical professor of medicine; Dr. Edwin Holladay, from lecturer to clinical professor of gynecology; Dr. Cornelius J. Tyson, from lecturer to clinical professor of medicine; Dr. Joseph H. Globus, from assistant professor to associate professor of neuroanatomy; Dr. Edward J. Riley, from lecturer to assistant clinical professor of medicine; Dr. George Slattery, from lecturer to assistant clinical professor of medicine.

University of Oklahoma School of Medicine

With the completion of the new medical school building in Oklahoma City, the School of Medicine becomes united in that city. The equipment has been transferred to the new building, and for the first time the entire four years work will be given at Oklahoma City when school opens, September 17. The premedical work will continue to be given at Norman, where other departments of the state university are located. There are four buildings in the group: the new medical school, the Children's Hospital, the University Hospital, and the outpatient clinic. All these buildings are on the campus except the last named, which is about thirteen blocks off the campus.

University of Colorado School of Medicine

Beginning January first, this school will offer a ten weeks' postgraduate course in ophthalmology.

University of California Medical School

Arrangements are being made to give a course of ten public lectures in San Francisco in which the history of medical science will be discussed by members of the medical profession. Topics to be discussed: ideals of the profession; problems of public health; outstanding features of medicine today; types of medical service rendered to the community.

University of Chicago

The faculty of the medical school announces the following appointments: William Robinson, Ph. D., assistant professor and Hilmeyer Cohen, Ph. D., instructor in the department of pathology, under the Otho S. A. Sprague Memorial Institute; Dr. Edward L. Compere, clinical instructor in the department of surgery; Dr. Dewey Katz, instructor in ophthalmology.

Promotions: Dr. H. Fielding Wilkinson, to an associate professorship and Dr. C. B. Huggins, to an assistant professorship in the department of surgery.

Mr. Julius Rosenwald has pledged a contribution not to exceed $5,000 for a period of five years for the purchase of books, periodicals and other scientific publications for the medical library at the University of Chicago, the yearly contributions to match whatever sums are contributed from other sources up to the amount of the pledge.

University of Southern California School of Medicine

Dr. Ernest M. Hall, assistant professor of pathology at Stanford University, has been appointed acting associate professor of histology. Dr. Hall is also pathologist at St. Vincent's Hospital.

Dr. Llewellyn C. Kellogg, professor of anatomy in the College of Medical Evangelists, has been appointed acting professor of anatomy.

Ohio University Student Health Service

The student health service of Ohio State University, Columbus, involving about 10,000 students, has been completely reorganized and placed under the supervision of the medical college of the university. The reorganized service will give first treatment or medical reference to students suffering from injury or illness but emphasis will be placed on preventive medicine through education. Students suffering from chronic conditions will be advised as to specialized care as well as

in general matters concerning health and personal hygiene. The service will furnish students with medical excuses from classes and will act in an advisory capacity to deans when the physical ability of students is concerned. It will acquaint parents or the family physician with the student's health status when advisable. When necessary to hospitalize a student, the health service will investigate the case and allow two days' free hospitalization a year. The student will meet all other charges himself. The health service will be financed by part of an additional fee of $1 a quarter per student. The director will be Col. James S. Wilson, U. S. Army, retired, who, since 1923, has been assistant professor of public health in the college of medicine.

University of Toronto Faculty of Medicine

Dr. William L. Holman has been appointed professor of bacteriology and associate director of applied bacteriology; Dr. William L. Robinson, associate professor and associate director of applied pathology, and Dr. Wallace A. Scott, assistant professor of obstetrics and gynecology.

University of Virginia Medical Department

Changes in Medical Faculty—Dr. Edwin P. Lehman, formerly associate professor of clinical surgery, Washington University Medical School, St. Louis, to be professor of surgery and gynecology, succeeding Dr. Stephen H. Watts, resigned. Dr. Sydney W. Britton, formerly of Johns Hopkins University School of Medicine, Baltimore, to be professor of physiology, succeeding Homer W. Smith, Sc. D., who goes to the physiologic department of New York University. Dr. Thelma F. Brumfield, promoted from instructor to assistant professor of bacteriology and pathology. Claude M. MacFall, formerly of the University of California, to be assistant professor of biology.

Albany Medical College

In connection with the campaign to raise a $2,000,000 endowment fund, a fund is being raised to establish a chair of chemistry in honor of Dr. William L. Pearson, Schenectady, who is completing his fiftieth year in the practice of medicine since graduating from the college. The memorial, which will be known as the Pearson Chair of Chemistry, will also memorialize his father's service to Union University Medical College, where he held the chair of chemistry for many years.

University of Georgia Medical Department

An Adjunct Faculty Association has been organized with Dr. Andrew A. Walden, Augusta, chairman. Members have been appointed to represent the adjunct faculty on the executive committee of the medical department and on the hospital board.

College of Medical Evangelists

An annual medical lectureship, to be known as the Benton N. Colver Lectures, has been established. The initial series was given by Walter R. Miles, Ph. D., professor of experimental psychology, Stanford University, on "Psychobiologic Investigation of Drugs." The topics of the three lectures were: (1) "Animal Learning and the Psycho-Bio-Assay of Drugs;" (2) "Important Drugs Weighed on the Behavior Balance," and (3) "Dilute Alcoholic Beverages and Human Behavior."

McGill University

A new building for experimental surgery and medicine has been completed—to be used by clinicians and research workers in the building for the biological sciences.

University of Texas School of Medicine

The equipment of a new laboratory of tropical medicine and additions to the children's hospital has been completed. All medical school laboratories are being enlarged. Certain changes are being made in the John Sealy Hospital, the teaching institution of the Medical De-

partment of the University of Texas. A new power plant is now under construction, which will serve the entire hospital units. The Children's Hospital is being enlarged so as to give additional ward space. Plans have been drawn for enlarging the nurses' home. The Sealy-Smith Foundation is now planning for a new $500,000.00 out-clinic building, which will be a valuable adjunct to the teaching of the third and fourth years. The details of this building have not been completed. Among the additions to the faculty are Dr. Edward Randall, Jr., as professor of materia medica and therapeutics; John G. Sinclair, professor of histology and embryology, and Dr. Paul Brindley, acting director of the department of pathology.

Columbia University Presbyterian Hospital Medical Center

The opening exercises were held October 12 and 13, 1928. Ceremonies included a university convocation at which honorary degrees were presented to the architect, Mr. James Gamble Rogers, the builder, Mr. Otto Eidlitz, the president of the Presbyterian Hospital, Mr. Dean Sage, and the donor of the land and of the private patients' pavilion, Mr. Edward S. Harkness.

The buildings were opened for inspection by the public and the ceremonies at the university convocation were opened by an academic procession including the faculties of the medical and dental schools, trustees of the university and of affiliated hospitals, and guests from other universities in the United States and England. Reports on the work of various departments of the medical school were presented throughout the day and several dinners in honor of the invited guests were given at night.

A great deal of interest was manifested by the general public as well as by the alumni of the schools concerned and many visitors took the opportunity of inspecting the buildings at this time.

The eleven units comprised in the group of buildings now completed or nearing completion include the College of Physicians and Surgeons of Columbia University, Presbyterian Hospital, Sloane Hospital for Women, Squier Urological Clinic, Harkness Private Pavilion, Vanderbilt Clinic, Anna C. Maxwell Hall (the residence of the Presbyterian Hospital school of nursing), the Babies' Hospital, the Neurological Institute, the New York State Psychiatric Institute and Hospital, and the School of Dental and Oral Surgery of Columbia University.

Baylor University College of Medicine

Dr. Maurice L. Richardson, formerly of Western Reserve University School of Medicine has been appointed professor of pathology, and Dr. Harold E. Smith, assistant pathologist; Dr. Thurston L. Johnston has been appointed associate professor of bacteriology.

University of Oregon Medical School

Dr. Wilmot C. Foster, assistant professor of anatomy, has resigned to continue work at the Mayo Foundation.

In acknowledgement of his valuable services for ten years, John F. Dickson, head of the department of eye, ear, nose and throat, has been appointed emeritus professor of ophthalmology. The department has been divided into otolaryngology, headed by Ralph A. Fenton, clinical professor of otolaryngology and ophthalmology, headed by Frederick H. Kiehle, clinical professor of ophthalmology. Other appointments made in these departments are: Dr. John N. Coghlan, clinical professor of otolaryngology; Frank B. Kistner, associate clinical professor of otolaryngology; and Joseph L. McCool, associate clinical professor of ophthalmology.

Dr. Edwin E. Osgood, who recently returned from a year's leave of absence spent in study in Vienna, has been appointed assistant professor of biochemistry and director of clinical laboratories. Dr. Osgood is also associate in medicine.

The following appointments have been made in the departments of medicine, surgery and pediatrics: Noble Wiley

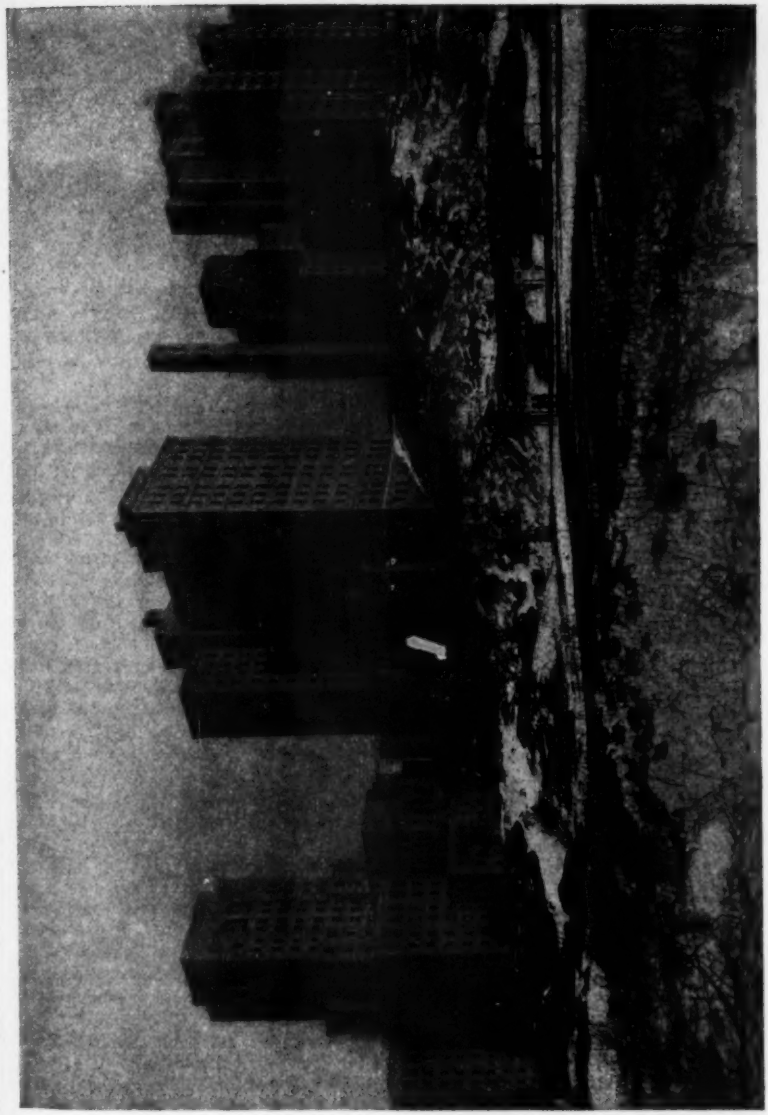

Photo by Underwood & Underwood *Joint Administrative Board, 17 E. 42nd St., New York City*

MEDICAL CENTER, NEW YORK, MARCH, 1928

To the right is the twenty-two story Presbyterian Hospital building which will also house Sloane Hospital for Women and Squier Clinic. The lower building in the right foreground is the Stephen V. Harkness Pavilion for private patients. The Columbia University College of Physicians and Surgeons is the high building in the background adjoining the Presbyterian. In the center foreground is Anna C. Maxwell Hall, the residence for the Presbyterian Hospital School of Nursing. The large building to the left is the New York State Psychiatric Institute and Hospital.

Vanderbilt Clinic and the Columbia University School of Dental and Oral Surgery are obscured in this view. The Babies' Hospital will soon appear to the extreme right of the Presbyterian. The Neurological Institute will fill the sky line between the New York State Psychiatric Institute and Anna C. Maxwell Hall.

Jones and T. Homer Coffen, clinical professors of medicine; J. C. Elliott King, clinical professor of dermatology; Ralph C. Matson, associate clinical professor of medicine; Harold C. Bean, Marr Bisaillon, I. C. Brill, J. Allen Gilbert, William S. Knox, Ray Matson, Arthur Rosenfeld, Charles Edwin Sears, Joseph N. Short, assistant clinical professors of medicine; Lyle B. Kingery and Harvey G. Parker, assistant clinical professors of dermatology and syphilology; J. Guy Strohm, assistant clinical professor of syphilology; J. Earl Else, Robert C. Coffey, William B. Holden, Richard B. Dillehunt, clinical professors of surgery; Otis F. Akin, Thomas M. Joyce, Charles R. McClure, Ernst A. Sommer, associate clinical professors of surgery; Alvin W. Baird, Charles D. Bodine, Louis P. Gambee, Luther T. Hamilton, George Norman Pease, Eugene W. Rockey, Paul Rockey, assistant clinical professors of surgery; James Rosenfeld and L. Howard Smith, associate clinical professors of pediatrics.

Woman's Medical College of Pennsylvania

Miss Harriet L. Wilcox, of the bacteriological staff of the New York Board of Health Laboratories, has been granted leave of absence for six months and has accepted appointment as acting associate professor of bacteriology.

Dr. L. Napoleon Boston has been appointed professor of the principles and practice of medicine, succeeding Dr. R. Max Goepp who resigned last June.

Plans are being drawn for the new medical college and hospital building. This first and main building of the projected new Woman's Medical College Center will cost approximately $1,000,000, and is to be erected on a site of nine and one-half acres in the Falls of the Schuylkill district of Philadelphia. Ritter and Shay, of Philadelphia, are the architects, and Thomas B. Kidner, of New York, is consultant.

The change in location from the present site of the college and hospital on North College Avenue, will remove the institution from an over-hospitalized area to a rapidly growing industrial section of the city where there is no hospital within two miles.

The entering class in September, 1928, numbered forty-four students. Forty students to a class is the number considered by the faculty to be the present maximum capacity of the college for satisfactory work.

University of Kansas School of Medicine

Two new units recently provided for by the legislature are practically completed. One, the nurses' home, costing $100,000, was occupied a few weeks ago. It accommodates 80 nurses. The other, the ward building, costing $200,000, is practically completed but will not be opened until next summer.

During the past summer the experiment of sending volunteer medical students to take a two months apprenticeship with practitioners of the state proved very successful. Practically all the students reported that they were very much pleased with the service they received and the practitioners were equally well satisfied with the men they received.

Dr. Raymond F. Gard was appointed resident pathologist to the Bell Memorial Hospital and instructor in the department of pathology of the Medical School.

Dr. Cecil G. Leitch was appointed instructor in the department of pathology.

Queens University Faculty of Medicine

An anonymous donor has contributed $50,000 to establish a chair of preventive medicine in honor of Dr. Arthur Elliott, an alumnus, who formerly practiced in Belleville. The university hopes to obtain support from the government and others which will permit the erection of a public health building as a part of the faculty of medicine, with the idea of making it the center of health activities of the eastern counties of the province of Ontario.

Johns Hopkins University School of Medicine

A new five story laboratory building which will be joined with the old physi-

ologic chemistry building by a corridor is planned. The $350,000 structure will house the departments of physiology, pharmacy and physiologic chemistry. Dr. E. Kennerly Marshall will have charge of the first two floors, and Dr. John J. Abel, the third; the upper two floors will be occupied by the department of physiologic chemistry.

Lady Osler's Will

Lady Osler, who died August 31, left the library at Johns Hopkins University, known as the Tudor and Stuart Club, $8,700, the Gross Library at the Philadelphia College of Physicians, $2,850, and Jefferson Medical College, Philadelphia, $24,250, to establish a lectureship in surgery in memory of her first husband, Dr. Samuel W. Gross.

Army Interns Must Serve at Least Two Years

An order has been issued by the Secretary of War which is intended to stop the practice of graduate medical students resigning immediately after concluding their internship training in army hospitals. Such resignations take undue advantage of the government, as the young medical graduates who resign have not only had their internship at the expense of the government but have received during that time the pay of a regular army officer of the same grade. Their pay varies from $2,200 to $3,200 a year, according to whether they have dependents or not. The policy of accepting young medical graduates for internship in the large army hospitals on the status of commissioned officers was inaugurated by the war department to build up the regular army medical corps. It was not intended that they should resign to engage in the private practice of medicine immediately after receiving their training. During the period in which this internship training policy has been followed in the army, ninety-five medical college graduates have accepted appointments in the medical corps and thirty-two of them have withdrawn from the service. For the purpose of overcoming this unfair practice, the Secretary of War has directed that hereafter appointments of interns in army hospitals shall include a contract that the officer appointed shall serve two years, or such longer period as the surgeon general may consider proper after completion of the intern course and the acceptance of his commission as an officer of the regular army. The number of applicants for commission in the medical corps is many times the number of vacanies existing, and it is important that only those young physicians be selected for internship training who are earnestly and sincerely interested in qualifying for and accepting a commission in the regular army medical corps.

Medical Student Sues for Reinstatement

A suit was instituted in the District of Columbia Supreme Court, November 1, by a medical student from Cincinnati to compel the president of Howard University to restore his name to the roster of the freshman class in the medical school. The plaintiff complained that when school began, October 9, he was accepted as a member of the freshman class and a few days later was requested by the dean to withdraw, and that on refusing to do so his name was stricken from the rolls by the executive committee. He claims that the action of the committee was illegal, as a quorum was not present at the time the action was taken.—(*J. A. M. A.*, Nov. 24, 1928.)

Princeton University

Receipt of a gift of $60,000 is announced which completes the $2,000,000 campaign fund for advanced instruction and research in the physical and biologic sciences. With the $2,000,000 goes automatically a conditional gift of $1,000,000 from the General Education Board.

Mayo Foundation

The following physicians have been assigned as fellows: Surgery—Edgar F. Fincher, Jr., Atlanta, Ga.; Howard K. Gray, Omaha; Daniel R. Hardeman, Jr., Little Rock, Ark.; Lorin V. Hillyard, Los

Angeles; Herbert W. E. Johnson, Minneapolis; Samuel G. Major, Pittsburgh; James B. Mason, Trenton, N. J.; James T. Priestly, Jr., Des Moines, Iowa; Anna E. Purdy, Brooklyn. Medicine—Ralph G. Ball, Manhattan, Kan.; Elmer C. Bartels, Hamilton, Ohio; Thomas W. Blake, Olympia, Wash.; Charles F. Burke, Wayside, Wis.; Charles B. Chapman, Heron Lake, Minn.; William P. Corr, Juneau, Wis.; Harold J. Kullman, Detroit; Selma C. Mueller, Mount Clemens, Mich.; Colin C. Stewart, Jr.; Hanover, N. H. Urology—Frank C. Hamm, Fairbury, Neb. Neurology—Luman E. Daniels, Columbia Falls, Mont. Pediatrics—John W. Bradley, Wichita Falls, Texas.

Cornell University

The Heckscher Foundation for Research at Cornell University has appropriated $70,294 for forty-two research projects to be conducted this year. The major portion of the appropriations are for research in the natural sciences, although provision has been made for research in the biologic and physical sciences as well as the humanities. Almost the entire range of wavelengths from roentgen and ultraviolet rays to the shorter radio waves will be investigated. Among many other studies to be conducted is that of Joseph A. Dye, Ph. D., on tissue respiration and endocrine functions; of James B. Sumner, Ph. D., on the preparation and properties of crystalline urea; of Dr. G. H. Moughan, on the effect of radiant energy on the development of certain glands of chickens, and Professor H. L. Liddell, on the conditioned reflexes in the sheep and goat.

Abraham Flexner Lectures at Vanderbilt

The first series of lectures of the Abraham Flexner Lectureship, recently established at Vanderbilt University School of Medicine, Nashville, were given by Dr. Heinrich Poll, director, Institute of Anatomy of the Faculty of the University of Hamburg, Germany. The subjects were: 1. "Teaching Anatomy from the Viewpoint of Melistic Structure" (given October 2). 2. "Melistic Structures of Endocrine Functions, Demonstrated in the Histophysiology of Sexhormone." 3. "Melistic Structure of the Supra-Individual Being." 4. "Melistic Structure of the Germ Plasm, Demonstrated by Investigations on Twinning." 5. "The Theory of the Melos."

Medical Education of Women

The joint committee of women's organizations to promote equal opportunities for women with men in the medical and hospital services of London has issued a memorandum urging the need of reversing the decision come to by some of the London hospitals to close their medical schools to women students. The position is thus described: There is at present one medical school—the London (Royal Free Hospital) School of Medicine for Women—reserved exclusively for women. The University College Hospital Medical School permits not more than twelve women entrants a year, of whom eight are taken from the students of University College, leaving four vacancies for students from elsewhere, including Oxford and Cambridge. The medical schools of three hospitals (St. George's, the London and St. Mary's), which for some years admitted women students, have now closed their doors to them, and three others (Westminster, Charing Cross and King's College) have decided to admit no new women entrants, while allowing those at present in training to complete their course. Replying to the alleged dislike of coeducation due to the "sense of delicacy" felt by medical students, the memorandum says: "We repeat that we are not concerned to urge universal and compulsory coeducation. But if men cannot bear to receive instruction in the ward or in the classroom with women medical students, how can they cooperate in the intimate offices of the sickroom with women nurses? And how can they assure those women patients who hesitate to employ a male physician that their attitude is purely scientific and humanitarian, stripped from the consciousness of sex?" The memorandum submits that though the number of women medical students may fluctuate from

time to time the general tendency will be toward a general increase, as a result of (1) the increasing demand for women physicians under local authorities in child welfare and maternity clinics and maternity hospitals, and (2) the probability, amounting to practical certainty, that within a few years either the system of national health insurance will be extended to cover dependant wives and children or a national health service covering these classes will be set up.—(*J. A. M. A.*, Oct. 6, 1928, p. 1047.)

Biochemists' Resolution on Teaching

The executive committee of the Annual Conference of Biological Chemists adopted a resolution protesting against any decrease in the number of hours allotted to biochemistry in the curriculum of medical schools and proposing that the prerequisites in chemistry be more definitely prescribed and, if possible, include quantitative analysis. The committee pointed out that many of the principal advances in medicine in the last twenty years were in the field of biochemistry and that "our best teachers of medicine and pediatrics are teaching largely in terms of biochemistry, thus making an extensive knowledge of this subject necessary in the training of any practitioner."

Immigrant Leaves Million for Hospital in Asia Minor

The will of Morris Schinasi, who died in September, bequeaths $1,000,000 to alleviate the suffering of the sick poor in the small city in Asia Minor from which he came to this country. It is placed in the hands of the Chemical National Bank as trustee, to erect and maintain a hospital at Magnesie, Asia Minor, as the will reads, "about two hours by railroad journey from Smyrna." Mr. Schinasi directed that not more than $200,000 be used for the erection of buildings and that the remainder be a perpetual trust from which the income would be paid quarterly to the governing board of the hospital. Mr. Schinasi's estate amounted to about $5,000,000, which he earned with his brother in the manufacture of cigarets. In addition to providing for his family in the will, he divided $300,000 among twenty hospitals and charitable institutions in New York, ten of which will receive $20,000 each and ten, $10,000 each.

Nobel Prize in Medicine

The Nobel prize in medicine for 1928 has been awarded to Dr. Charles Nicolle, for twenty-five years director of the Pasteur Institute of Tunis, for his work on typhus fever. In 1909, Nicolle first produced typhus in a monkey by injecting the blood from a patient, and in the same year Nicolle, Comte and Conseil transmitted the viruses from infected monkeys to noninfected monkeys by means of the bites of lice. In 1911, Nicolle, Conseil and Conor considered that the typhus viruses were mainly associated with the leukocystes and that the plasma was merely virulent from the debris of these cells. In 1916, according to Castellani and Chalmers' Manual of Tropical Medicine, Nicolle and Blaizot prepared an immune serum in horses and asses by the inoculation of emulsions of spleen and suprarenal capsules of infected guinea-pigs. They tested this immune serum on nineteen human patients and all treated in the early stages recovered quickly, but the infectious symptoms required repeated inoculations.

Basic Science Laws

In some states, interference with reciprocity is beginning to be noted on account of the enactment of the basis science laws. Graduates of class A medical schools who have passed their state board examinations and obtained licenses in their own state have encountered difficulty, delay and expense in securing licensure through reciprocity in states where basic science laws exist, even though the educational requirements in the latter state are not as high as in the state of original licensure. In view of this situation, the Ohio State Medical Board adopted in October a resolution that it regards such additional examina-

tion requirements in violation of the letter and spirit of reciprocity and that it "hereby abrogates all such agreements." The secretary of the board was directed to advise all boards of licensure of this action. The Ohio State Medical Board feels justified in demanding of other state licensing authorities equal legal rights and privileges for medical graduates licensed in Ohio who desire to remove to other states.

Julius Rosenwald Fund

Extension of the activities of the Julius Rosenwald Fund, heretofore chiefly concerned with building negro rural schools to include support of medical services to people of moderate means, is announced by Edwin R. Embree, president of the Fund. Michael M. Davis, Ph. D., has been appointed to the executive staff of the fund as director for medical services. He will direct the program which the fund is planning to undertake in cooperation with the medical profession to improve the organized facilities for medical service to the average man. In these activities special attention will be given to pay clinics. William B. Harrell, now assistant auditor of the University of Chicago, has been appointed secretary and comptroller of the Fund. Clark Foreman, who is now with the Phelps-Stokes Fund of New York, has been appointed associate field agent of the Julius Rosenwald Fund for southern schools and colleges. Dr. Franklin C. McLean, chief of the medical clinics of the University of Chicago, has been elected a trustee of the Julius Rosenwald Fund.

Additional Hospitals and Laboratories Approved

The Council on Medical Education and Hospitals of the American Medical Association has approved additional hospitals and clinical laboratories, as follows:

Hospitals approved for intern training: Danbury Hospital, Danbury, Conn.; Meriden Hospital, Meriden, Conn.; Columbus Hospital, Chicago; St. Anthony's Hospital, Rock Island, Ill.; Flint-Goodridge Hospital, New Orleans; St. Mary's Hospital, Saginaw, Mich.; Spartanburg General Hospital, Spartanburg, S. C.; St. Joseph's Hospital, Parkersburg, W. Va.; Providence Hospital, Seattle; Kingston General Hospital, Kingston, Ontario.

Hospitals approved for residencies in specialties: Decatur and Macon County Hospital, Decatur, Ill.; Baltimore City Hospitals, Baltimore; University of Maryland Hospital, Baltimore; The Deaconess Hospital, Cincinnati; Children's Orthopedic Hospital, Seattle.

Clinical laboratories approved: Clinical Laboratory, B. Martell, M. D., Director, Santa Ana, Calif.; Physicians' Clinical Laboratory, V. D. Keiser, M. D., Director, Indianapolis; Finley Hospital Laboratory of Pathology, Frank P. McNamara, M. D., Director, Dubuque, Iowa; The Diagnostic Laboratories of the Bulluck Hospital, Ernest S. Bulluck, M. D., Director, Wilmington, N. C.; Northwest Clinic, C. J. Watson, M. D., Director, Minot, N. D.; Laboratory of Dr. S. S. Hindman, Toledo, Ohio; Private Laboratory of Dr. J. H. Litterer, Nashville, Tenn.; The Queen's Hospital Laboratory, Nils P. Larsen, M. D., Director, Honolulu, Hawaii.

The Full Time Clinical Teacher

The committee appointed two years ago by the house of delegates of the Michigan State Medical Society to study medical charity in Michigan has made its final report. Part I deals with community hospitals and part II with the University Hospital. In the matter of full-time clinical teachers, the committee believes that it is essential that a teacher should maintain contact with patients in actual private practice and that this cannot find its best expression in the full-time plan.

Experience seems to demonstrate that the question of "full-time" is not the essential element—it is the individual. It has not worked out satisfactorily at Ann Arbor, and many who were in favor of it before its adoption are now lukewarm or opposed to it in its present form. . . . This is state medicine for the sake of education, but nevertheless state medicine, and there seems to be no sufficient reason for it. If the university medical school and hospital, to which we look for the high standards, not only in scien-

tific medicine, but as well in medical social ethics, are receptive to such practice, into what depths of unsoundness may not the rest of us be induced to dip?

The committee suggests that this practice be annulled, if not at once at least gradually. The committe comprised Drs. Richard R. Smith, Grand Rapids; John Walter Vaughan, Detroit, and William H. Marshall, Flint. The report was adopted by the house of delegates in September.

Teaching Fellowships in University of Dublin

Three research and teaching fellowships of the value of 500 pounds a year (about $2500) will be established by the Rockefeller Foundation in the medical school of the University of Dublin. One became effective in October, 1928, in public health. The second will become effective in October, 1929; the third in October, 1931.

Medical Students in University of Paris

According to Professor Roger, dean of the Faculté de médicine de Paris, the total number of students for 1924-1925 was 2,510; 1925-1926, 2,515; 1926-1927, 2,676. The number of students matriculating for the first time was: 1924-1925, Frenchmen, 533; foreigners, 203; 1925-1926, Frenchmen, 561; foreigners, 237; 1926-1927, Frenchmen, 607; foreigners, 295.

University of Capetown New Medical School

The second of the two blocks constituting the Wernher-Beit Laboratories of the Medical Department of the University of Capetown has recently been completed and is now in active occupation. It lies adjacent to, and parallel with, the first block at its southwestern extremity; it consists of three floors, and in shape resembles the letter E. In it are housed the departments of anatomy, physiology and physiologic chemistry.

Department of Anatomy

The department of anatomy is in charge of Professor M. R. Drennan, who is assisted by a staff of lecturers and technical assistants. It occupies the entire southwestern half (or right wing) of the new building, comprising all three floors, which are connected by the main stairway and a large electrically driven lift. The receiving room, a commodious apartment provided with three fixed post-mortem tables and with large slate chests and earthenware troughs for the storage of wet teaching preparations, is situated on the ground floor. Adjoining the receiving room is a spacious workshop equipped with the appropriate appliances, and with a large and a small bandsaw for cutting sections of the hardened body. These saws and the other machinery are electrically driven by means of pulley belts operated from overhead shafts. In the receiving room the bodies are hardened, injected, and prepared for dissection. Opening from the opposite end of the receiving room is the tank room, containing three large built-in, slate-lined storage tanks in which the bodies are stored in the dry state. The capacity of these tanks is some fifty bodies—a more than ample supply. By a special Anatomy Act the medical school is allowed the use of bodies for six months, at the expiration of which they must be coffined for burial. Material is derived from unclaimed corpses, which, in a country of immense distances like South Africa, with an overwhelming preponderance of native population, are particularly numerous. So ample is the supply of material that each student is expected to dissect the human body at least twice. On the ground floor also is a dark room fitted with two fixed projection microscopes of the Edinger type for the reconstruction of models from microscopic specimens or sections, and adjacent are two photographic dark rooms suitably equipped. The remaining apartment on this floor consists of a technical assistant's room, with adjoining bone depository or library. The latter contains a series of some five hundred built-in wooden boxes for the reception of osseous specimens, each box being provided with an index card that greatly facilitates reference to particular specimens.

Dissecting Room Features

On the first floor is situated the main dissecting room for students, containing sixteen marble-topped teak tables. Each table is provided with four teak stools with leather-thonged seats, and is lighted by two overhead electric lamps. There are also central flood lights fixed to the ceiling. The floor is cemented and built with a camber to facilitate flushing, the water being carried off by a drain at one end. A large electric geyser ensures a plentiful supply of hot water. Lockers for students are provided in the corridor just outside the dissecting room. A separate dissecting room for women students contains four tables arranged much as in the men's dissecting room; although the sexes are separated in the dissecting room both attend the same lectures and demonstrations. On the first floor there is also a laboratory for embryologic research and a room for a study of surface anatomy; this latter room is furnished with weighing scales, height-measuring devices, and other anthropometric appliances. Two cubicles are provided where students may disrobe and study surface markings on each other. A locker room and a retiring room for lecturers complete the accommodation on this floor.

Anatomical Museum

The top floor contains the lecture theater, accommodating about 120 students in ascending tiers of seats built in a semicircular amphitheater. Ten windows at the back and sides of the apartment provide adequate lighting. An Edinger projector for microscopic specimens is installed, and an epidiascope is to be provided later. Just outside the two entrances to the theater are recesses, one of which contains a large chest with sliding drawers in which diagrams and charts can be filed on the flat, while the other contains storage space for bones, models, and other specimens used to illustrate the lectures. The spacious anatomy museum, also on the top floor, contains eight glass showcases centrally arranged, as well as two large glass wall cases containing anatomic models and embryologic and anthropologic preparations. The museum is also fitted along one side with thirty glass-topped cabinets with protecting wooden lids, for the demonstration of delicate specimens without risk or damage. A card descriptive of each specimen is fixed to the inside of the wooden lid and is available for speedy reference. Adjoining the museum is a large laboratory for the study of physical anthropology, equipped with a dioptograph and other instruments for the exact measurement of specimens. Further along the corridor are two research rooms for private study, and another apartment, fitted with metal shelving, for the storage of glass-jar preparations. The professor's retiring room is comfortably furnished, and, with a private laboratory, completes the accommodation of this department.

The left wing of the new block is occupied by the departments of physiology and physiologic chemistry. In charge of the department of physiology is Professor W. A. Jolly, dean of the medical faculty of the university, while Dr. L. Bosman is lecturer in charge of the department of physiologic chemistry.

Physiologic Equipment

On the ground floor of the new block are the retiring room of the professor of physiology and his private laboratory. The electrophysiology room opposite is completely equipped for investigating the electrophysical reactions of living tissue; two string galvanometers working in conjunction make it possible to record graphically the responses of two separate organs simultaneously. The physiology museum contains large cases in which are displayed instruments used in experimental physiology and models of organs. On this floor is also a large workshop fitted with the tools necessary for the upkeep of the instruments used by the department. Here, too, new apparatus is constructed and instruments are copied. Adjoining the workshop is the battery room, containing a motor transformer for converting alternating current from the mains to direct current. Leading from the corridor is the students' histology room, accommodating from forty to fifty students. It is equipped with four rows

of benches, each student being furnished with a microscope, an illuminating lamp, and complete sets of reagents. Adjoining this room is a preparation room, where specimens used in connection with the class are prepared. On the ground floor is also a large laboratory or histology preparation room fitted with a fume chamber, and electric and gas incubators. A plethysmograph room and a photographic dark room complete the accommodation on the ground floor.

PROVISION FOR RESEARCH

The first floor, like the ground floor, is occupied by the department of physiology; here is situated the lecture theater, accommodating about 120 students. Armchairs replace the usual benches in order to obviate bending forward over a desk and interference with natural respiration. The right-hand arm of each chair ends in a broad expansion on which the student may write while sitting erect. On this floor there is also a large experimental laboratory for students, fitted with a fume chamber, an apparatus for smoking record paper, and working benches. Each student is provided with the most up-to-date type of revolving drum driven by means of overhead shafting operated by electricity. A separate experimental laboratory for advanced students contains a large kymograph, and adjoins a preparation room. In addition there is a large research laboratory.

PHYSIOLOGIC CHEMISTRY

The top floor is occupied by the department of physiologic chemistry, and contains a student' laboratory accommodating forty students and fitted with the necessary apparatus and reagents. A small demonstration theater adjoins it. The dark room contains up-to-date polarimeters and calorimeters, and is otherwise equipped for the work of the department. Opposite is a research room used at present for the clinical work derived from the General Hospital. The remainder of this floor consists of a lecturers' room and private laboratory, a pathologic chemistry room, a low temperature room and a store room.—*British M. J.*: 2:813 (Nov. 3) 1928.

Dalhousie University Faculty of Medicine

During the week of October fifteenth, the Medical Society of Nova Scotia celebrated the seventy-fifth anniversary of its foundation. The society cooperated with the Faculty of Medicine of Dalhousie University, which during that week conducted its annual refresher course for physicians, and celebrated the sixtieth anniversary of its establishment.

In connection with the refresher course, teachers from the Universities of McGill, Toronto, Western Ontario, and Manitoba, took part, while the profession of Alberta and British Columbia was also represented in the teaching. At a special convocation, the tablet memorialled to the original faculty, presented by the Halifax Medical Society, was unveiled, and portraits of several former members of the faculty, were presented to the medical school. A statuette of the late Sir Charles Tupper, who was active in the establishment of the medical faculty, was also presented. The honorary degree of LL.D. was conferred upon Dr. W. W. Chipman, of Montreal, and Alexander Primrose, of Toronto.

A feature of the anniversary of the medical school was a dinner, held at the Lord Nelson Hotel, which was attended by a very large number of graduates of the school, and representatives of other Canadian medical schools.

Dr. E. W. H. Cruickshank, a graduate of Washington University Medical School, who has been appointed to succeed Dr. Boris Babkin, as professor of physiology at Dalhousie University, is to take on his new duties in December. Dr. Cruickshank has been teaching physiology at the medical college at Tatma, India. Formerly he taught at the Peking Union Medical College, China. Pending his arrival, Dr. N. B. Dreyer, formerly of the Department of Physiology of Dalhousie, but now of the Department of Pharmacology of McGill University, is teaching at the Dalhousie Medical School. Dr. Babkin left Dalhousie to accept the position of Research Professor of Physiology at McGill University.

Personals

Dr. R. G. Green, of the department of bacteriology and immunology of the Medical School of the University of Minnesota, lectured on "Encephalomyelitis of Carnivorous Animals" before the departmen of animal pathology of the Rockefeller Institute.

Dr. Stephen H. Watts, for more than 20 years professor of surgery in the University of Virginia, has resigned and retired from active practice.

Dr. Michael G. Wohl has been appointed head of the department of research medicine in Temple University.

Dr. William F. Lockwood, Baltimore, at one time dean and professor of medicine of the College of Physicians and Surgeons which merged with the University of Maryland School of Medicine, and professor of medicine in the latter school, died recently.

Dr. Charles P. Emerson, dean of the Medical School of Indiana University, was elected president of the newly established American Foundation for Mental Hygiene.

Dr. F. d'Herelle, professor of bacteriology in the school of medicine of Yale University, delivered the second Harvey Society lecture before the New York Academy of Medicine. His subject was "The Nature of the Ultraviruses."

A memorial meeting in honor of the late Dr. Hideyo Noguchi was held in Cincinnati November 18. The principal address was delivered by Dr. Frank Billings, Chicago.

Dr. Lawrence W. Smith has resigned as assistant professor of pathology in Harvard Medical School.

Dr. Harry V. Atkinson, formerly associate professor of pharmacology at the University of Iowa, has accepted the position of professor of physiology and pharmacology at the University of South Dakota.

Dr. James E. Rush, head of the department and professor of hygiene and public health in the University of Kentucky, Lexington, has resigned.

Dr. Jan B. Jansen, professor of anatomy at Oslo, Norway, is spending a year in research at Boston University.

Sir Samuel Squire Sprigge, editor of the London *Lancet,* has been visiting medical schools in the United States and Canada. On his return to England he will report on his observations of medical education in these countries.

Dr. Edwin O. Jordan, professor of bacteriology and preventive medicine in the University of Chicago, has been appointed Cutter lecturer in preventive medicine at Harvard University for 1928-1929.

Dr. Fielding H. Garrison, of the Surgeon General's Library, has been appointed consulting librarian of the William H. Welch Medical Library of Johns Hopkins University.

Dr. Harvey Cushing, professor of surgery, Harvard Medical School, has received the decoration of Commander of the Order del Sol of Peru.

Dr. T. L. Patterson, professor and head of the department of physiology in Detroit College of Medicine, served as acting professor of physiology at Stanford during the past summer. He studied on the physiology of the gastric activity of

marine animals, working in the Jacques Loeb Laboratory for physiological research at the Hopkins Marine Station of Stanford University, Pacific Grove, California.

Dr. Frederick C. Hicks, president of the University of Cincinnati, has retired. Dean Snyder, of the Engineering College, has been appointed acting president.

Dr. Victor E. Emmel, professor and head of the department of anatomy in the College of Medicine of the University of Illinois, died recently from heart disease.

Dr. Henry Keller has been appointed chief of clinic of the orthopedic department at New York University and Bellevue Hospital Medical College and also clinical professor of orthopedic surgery.

Dr. Michael G. Wohl has been appointed head of the department of research medicine, Temple University School of Medicine.

Dr. Robert A. Lambert has resigned as director of the School of Tropical Medicine in San Juan, Porto Rico, which is under the auspices of Columbia University, New York, and has accepted a post as associate director of medical education with the Rockefeller Foundation.

Dr. Earl B. McKinley, formerly a member of the staff of the International Health Division of the Rockefeller Foundation, has been appointed professor of bacteriology in the College of Physicians and Surgeons, Columbia University, and director of the School of Tropical Medicine in Porto Rico.

Dr. Edward L. Miloslavich, professor and head of the department of pathology and bacteriology of Marquette University School of Medicine, has resigned to accept the directorship of the department of clinical pathology and medical research at St. Mary's Hospital, Milwaukee.

Dr. George Paul LaRoque has been appointed head of the department of surgery at the Medical College of Virginia, Richmond, to fill the vacancy created by the resignation of Dr. A. Murat Willis.

Dr. William C. White, U. S. Public Health Service, has taken up his duties as chairman of the division of medical sciences of the National Research Council for the ensuing year.

Dr. Howard T. Karsner has returned from Washington, D. C., to Cleveland to reassume his duties at Western Reserve University, having been relieved as chairman of the medical science division of the National Research Council.

Dr. Harry J. Deuel, Jr., assistant professor of physiology, Cornell University Medical School, has been appointed professor and head of the department of physiology in the University of Maryland School of Medicine.

Dr. Reuben L. Kahn, the originator of the Kahn test, has been appointed director of laboratories and assistant professor of clinical bacteriology and serology in the University of Michigan Medical School.

Dr. Greenfield Sluder, professor of otolaryngology in Washington University School of Medicine for more than twenty years, died October 9.

Dr. Charles H. Nielson, professor of medicine in St. Louis University, has been appointed associate dean, succeeding the late Dr. Joseph.

Dr. A. M. Willis, for many years professor of surgery in the Medical College of Virginia, Richmond, has resigned.

Dr. Ko K. Chen, associate in pharmacology, Johns Hopkins University School of Medicine, Baltimore, was awarded a

prize of $2,000 (Mexican) for his researches on ephedrine and other Chinese drugs by the China Foundation for the Promotion of Education and Culture.

Dr. George M. Kober, for twenty-seven years dean of Georgetown University School of Medicine, has resigned. Dr. Kober is an ex-president of this Association and was the chairman of its first curriculum committee in 1905. In recognition of his services the university authorities have made Dr. Kober a member of the board of regents and dean emeritus of the medical school from which Dr. Kober graduated in 1873.

Dr. Hilding Berglund of the University of Minnesota Medical School, Minneapolis, is in Peking, China, for a year as visiting professor of medicine under the Rockefeller Foundation at the Peking Union Medical College.

Dr. Eric A. Fennel has been appointed associate professor in the University of Illinois College of Medicine.

Dr. Roger I. Lee, professor of hygiene of Harvard University Medical School, was elected chairman of the committee on public health of the Boston Chamber of Commerce.

Dr. Arnold R. Rich, associate professor of pathology in the Johns Hopkins University School of Medicine, delivered the annual Gross lecture of the Pathological Society of Philadelphia in November.

Professor Luigi Sabatani, professor of pharmacology in the University of Padua, died recently.

Dr. H. B. Williams, director of the department of physiology in the College of Physicians and Surgeons, of Columbia University, delivered the third annual Priestley lecture at Pennsylvania State College last November.

Dr. Henry Daspit has been appointed dean of the Graduate School of Medicine of Tulane University of Louisiana, to succeed Dr. Edmund D. Martin.

Dr. Thomas P. Haslam has been appointed associate professor of pathology at Baylor University College of Medicine, Dallas, and medical director of the Baylor Hospital Clinic.

Dr. John Stewart, dean of the faculty of medicine of Dalhousie University, Halifax, Nova Scotia, recently celebrated his eightieth birthday.

Professor Carl L. A. Schmidt, professor of biochemistry in the University of California, has received a research award of $750 from Sigma Xi.

Dr. Alexander Maximow, professor of anatomy in the University of Chicago, died suddenly in December.

A testimonial dinner was given recently in honor of Dr. William H. Welch, professor of the history of medicine and director emeritus of the Johns Hopkins University School of Hygiene and Public Health.

Dr. W. B. Cannon, George Higginson professor of physiology in the Harvard Medical School, has been appointed exchange professor to France for 1929-1930.

The Gedge prize for original observations in physiology has been awarded to Dr. W. A. H. Rushton of Pembroke College, Cambridge, England.

Dr. William T. Bovie, professor of biophysics in Northwestern University Medical School, was awarded the John Scott medal, which includes $1,000, for contributions to medicine on the study and development of equipment whereby incisions may be made with an electric current instead of the knife.

Abstracts of Current Literature

Aids to Learning

Associations can be multiplied not only between cognate fields of knowledge, but within each field itself. Some of these methods are discussion and debate, and reading different books in the same field. There is another method, which is among the most efficacious; and that is, to write about the subject. To quote Bacon, "Reading maketh a full man, conference a ready man, and writing an exact man. And, therefore, if a man write little, he had need have a great memory." It is not, however, merely that writing about a subject improves the memory of it; still more it improves the clearness of a subject in the mind. Writers of monographs and testbooks not infrequently acknowledge that the persons to whom the writing has been most beneficial are the authors themselves. Lord Kelvin is reported to have said that he did not feel that he fully understood anything until he had made a working model of it. Most of us cannot, without disproportionate labor, make a working model of a problem in carbohydrate metabolism, or even of a murmurous heart; but to be able to write a coherent and lucid description of such things is a great advance on merely having memorized some testbook account of them. It is not possible to perform this service for every topic while preparing for an examination, but how seldom is it done even for the most difficult? One of the most valuable of such exercises is the writing of "papers," especially papers on some piece of "original" work (it need not be very original), and not merely critical summaries of literature. The latter, however, can also be very useful in this way; for the reading of original articles in the medical press and the constructive summarizing thereafter of a number of articles on kindred topics is a pleasant and often very stimulating variant to poring over textbooks. It also has the advantage of "mobilizing" one's knowledge. Original work, being less cut and dried and dogmatic than textbooks, leads to questioning and to an open mind. The air of authority, too, is less overwhelming in them than in standard books, the constant perusal of which, if unvaried by occasional resort to originals, tends to stifle intelligence. The first few years after graduation have often to be spent by the young medical man in ridding himself of the unquestioning faith in authority and the printed word that he has acquired during his student days, and of the parrot-like habits of memorizing, rather than understanding, a subject which, in defiance of the methods recommended above, many men adopt in their work for examinations. It is a good thing that the student should regularly read—in selective fashion, of course—one of the current general medical periodicals, together with occasional numbers of the more specialized journals, dealing with any subject to which he happens to be specially attracted.—GILLESPIE, R. D.: *British M. J.* 2:365 (Sept. 1) 1928.

How to Study

Modern education, and even medical education, is beginning to set less value on overloading the memory with unrelated and undigested facts than formerly. Epictetus long ago compared the memorizing system to the behavior of sheep who, after they had been feeding, should present their shepherds with the very grass itself which they had cropped and swallowed instead of concocting it into wool and milk. The elementary sciences, the premedical subjects of chemistry, physics, biology, and botany, are in the curriculum to familiarize the student with the structure and behavior of the materials with which, and upon which, he will have to work, also with the instruments that will aid him in his task. The student passes from generalized studies

to a particularized study of human structure and function in anatomy and physiology, together with the chemistry and physics of living tissues. The main object of these studies is to train the eye to observe, the mind to reason, and the hand to act, though there is a danger that the intervention of examinations may obscure this object. Anatomy, above all other subjects in the curriculum, may be so taught as to become a matter of memory and nothing else. It is possible for a student with a retentive memory to gain the approbation of teachers and examiners by the very methods that would have caused the shepherds to slaughter Epictetus's sheep out of hand. Nowadays to probe deeper into Nature's mysteries of health and sickness the student must spend many hours not in memorizing all the wisdom of the ancients, but in learning to use the tools of a calling in which every craftsman must observe for himself. Still there hangs over him the threatening storm-cloud of examinations. Tradition adds to the terror by persisting that examiners in clinical subjects prefer feats of memory to proofs of ability to observe accurately and reason clearly. Any accurate observer can be trusted to amass a useful store of experience; no store of remembered facts can come to the rescue of inaccurate observation. It is of little use knowing how to perform a given operation if the skill to perceive the need for the operation is lacking.

Medical education seems to the beginner to waste a great deal of time in the preliminary sciences, but their study involves the use of a large variety of instruments of precision, it imparts accuracy to the organs of perception, and trains the mind to logical reasoning. Clinical medicine demands the use of many instrumental aids to the organs of perception. The extremest and simplest illustration of their use lies in roentgen rays, without which the eye of the keenest observer would be blind. The medical student, then, must learn by constant practice the operations of surgery, how to employ the stethoscope, laryngoscope, ophthalmoscope, cystoscope, and any other instruments which represent to the doctor the telescope of the astronomer. Moreover, he must, in addition, use the microscope and the test tube.—Nixon, J. A.: *British M. J.* 2:363 (Sept. 1) 1923.

Progress of Medical Research in South

From evidence at hand it is apparent that research in the South is not being done in proportion to that being done in the North. Further, it is evident that the internist, with but few exceptions, is not seriously interested in the doing of research work. His interest is confined to the end results that will help in the diagnosis or the treatment of his patient. He depends too often and too completely on the research worker to solve all of his problems. This will undoubtedly result in a narrowing of vision and a dullness of perception on the part of the practicing internist. I can see no necessity for the four years medical training to prepare an individual for medical research, but it does seem to be evident that in every instance medical research should be coordinated and that it can be best done by a person with a medical as well as a practical training. It is suggested that coordination of research be carried to the extent that, in diseases bearing any relation to heredity, the biologists become a part of the consulting research corps. The answers to my questionnaire indicated that, except for the research work which is being done at Tulane University in New Orleans, which is of the highest type, there is no outstanding research work being done in the South. Duke University is preparing to do considerable research, directed particularly at Southern problems. More or less research is being done in some of the other medical colleges but there are a few, both state and sectarian, where no attempt whatever on the part of the medical college is being made to do research, nor is any attempt being made to inspire the medical student with an inquisitive spirit which would lead him to take up these unsolved problems. In some instances the answers to the ques-

tionnaires indicated a lamentable lack of knowledge of both Pellagra and Dengue Fever on the part of those in authority in public health positions. Although the question was not asked, no reply indicated that either the absence of research or the small amount being done was due to finances. From observations made in medical centers in the East and Middle West, this would hardly be a legitimate excuse. The lack of research in so many medical schools, and the absence of the spirit that engenders it, possibly accounts for the lack on the part of the young doctor coming out of college and hospital possessing the desire to investigate thoroughly those problems difficult of solution. That, with the remuneration offered the successful physician and the poor proportional return to the research worker, possibly accounts for the few medical men undertaking pure research.—T. Z. Cason: *Annals of Internal Medicine*, II:313 (Oct.) 1928.

Medical Education in South Pacific

The medical care of natives in the South Pacific is the most difficult part of the task of their conservation. It is possible by quarantine to keep out most diseases; it is possible by concentration on one endemic disease to bring it under control; but to care for epidemics that do enter in spite of quarantine as well as to care for current sicknesses is difficult with limited finances in scattered island groups with large populations. One can get qualified men to run hospitals and care for people at central points. But white men cannot and will not endure for long the hardships entailed by caring for natives under primitive conditions. In addition, if one gets such men, they are handicapped for years by ignorance of the native language; if they learn the language, few attempt to learn the customs and consequent mental processes of the native patient, whereby alone they could best serve them. On the other hand, while it is perfectly true that most native races have members mentally capable of qualifying in medicine, that would not solve the problem, for then there would be men educated to the point where they could be paid little less than a qualified European. They would also have little taste for bush life. In Papua and New Guinea they attempt with some success to work a change with "small doctors," laymen who are taught simple medicine. In Fiji they attempted to solve this problem fifty years ago by establishing in connection with their Suva Hospital a native medical school. Bright boys are selected by competition in the three "R's." They are put in the hospital where they make the rounds of the wards with physicians, assist in surgery, do dressings and put up medicines. They receive regular courses of lectures by the physicians. After three years, having passed their examinations successfully, they receive the degree of Native Medical Practitioner and are established with small hospitals throughout the colony under supervision of white medical officers. On the whole this plan has worked remarkably well. Other island governments have tried to follow this plan, but they were comparatively unsuccessful as there is no other medical center as large as Suva. As a result there has arisen in the past few years a general feeling in the British groups that this school ought to be expanded. This feeling was easily crystalized and there is now being completed in Suva in connection with its fine War Memorial Hospital of a hundred beds the several buildings necessary to enlarge the old school of sixteen students to a new school of forty students to serve the seven South Pacific groups which have cooperated, Samoa, Fiji, Cook Islands, British Solomons, Gilbert and Ellice Islands, Tonga and possibly the New Hebrides. The course is for three years, but planned to be expanded to a four years' course later on. There will be one full-time medical pedagogue and a medical faculty of six part-time physicians. The courses will include lectures and dissection in anatomy, lectures and demonstrations in surgery, lectures and demonstrations in materia medica, therapeutics and medicine and lectures and demonstrations in physiology and chemistry, lectures in ophthalmology, lectures

and demonstrations in obstetrics. According to a quota based on population, the cooperating groups will send boys to Fiji to be educated and returned to them. The graduates of this school will gradually fill the medical blanks of the South Pacific and should cause a profound change in health conditions. The school was opened formally in November, 1928. LAMBERT, S. M.: *Med. J. Australia*, 2:363 (Sept. 22) 1928.

Teaching of Hygiene

Great differences exist between the courses of instruction in preventive medicine given in the various medical schools, both in regard to the number of lectures and in regard to the subjects discussed. In certain schools, mainly in London, ten or a dozen lectures seem all that can be included in the curriculum, whereas in the provincial universities twenty, thirty or even more lectures may be given. This is probably due to the fact that the provincial medical officer of health has usually a much greater influence on the policy of his local medical school than is possible in the case of his metropolitan confrere. Then it is the practice in certain schools to devote a considerable amount of time to lectures on general sanitation and to demonstrations on water purification, sewage disposal, sanitary appliances, and the like; in other schools but little attention is paid to this aspect of the question. Variety in the method of presentation of a subject is always to be commended, but preventive medicine is so vast and so important a study that some discrimination must be exercised in the selection of the material to be presented to the medical student, more particularly in view of the already crowded state of the medical curriculum. It may or may not be the case that the various teachers act on the advice of the General Medical Council and endeavor to keep before the notice of the student the importance of the preventive aspects of medicine; in any event it is at least convenient that one lecturer should touch on the various subjects of the curriculum and lay stress in each case on methods of prevention. Preventive medicine ranges over many fields and can have no recognized limits as have certain of the other subjects taught in our medical schools. To my way of thinking a lecturer in preventive medicine achieves his object if he succeeds in arousing the interest of his class and in giving them a definite preventive point of view. He cannot turn medical students into medical officers of health by forcing them to attend a short course of lectures, but he can see to it that every young man or woman starting in practice is aware not only of the principles of prevention, but also of his own function as a practitioner of prevention. The student must be shown the place of the practitioner in relation to the various schemes organized and maintained by local authorities all over the country, and he must be taught the important influence of environment on health. If these matters are not placed clearly before him he will leave his medical school after acquiring knowledge in the dissecting room, the laboratory, the hospital ward and the outpatient department, and he will think in terms of these, to his own and to the nation's future detriment. A course of lectures on preventive medicine should be given in the final year of the medical curriculum and should deal, among other matters, with the triumphs and failures of prevention, with an outline of public health administration in this country, with the chief sources of statistical information and with the importance of correct certification and notification, with all the various organized schemes of prevention in existence and with the special measures available in connection with the principal groups of diseases, with the importance of pure air, pure water and pure food (this includes a good deal of personal hygiene), and with the evil effects of bad housing and unsanitary conditions generally. Throughout the whole course the part the student himself will have to play and the ways in which difficulties may be avoided or overcome must be kept constantly before his notice. In my judgment lectures dealing with details of constructional work and with compli-

cated processes of ventilation, water purification, sewage disposal and similar problems only confuse the student and make him feel he is being forced to listen to something which is really the business of experts and which will have only indirect bearing on his future practice; and I am not inclined to disagree with him. A course of lectures on the lines of Sir George Newman's Outline of the Practice of Preventive Medicine seems to me particularly well suited to medical students, and I always recommend that little book to them for their careful perusal.—W. W. JAMESON: *Brit. M. J.*, 2:733 (Oct. 27) 1928.

Family Budgets of University Faculty Members

For a long time the low salary of the professor has been a matter of discussion. The younger generation of this profession is, I think, unanimous in believing that the salary now offered in the academic world, especially to its higher ranks, is not one that can fairly be expected to meet the needs of the professional family. This assumption that, given the accepted professional standard of living, salaries usually paid university teachers will not meet the family living expenses and that to maintain the standard, supplementary earnings or vested income, one or both, become necessary, seemed to invite verification by the test of expenditures. In 1923, a keen interest in the real facts behind such statements led me to ask a number of faculty members at the University of California to give help in testing the truth of the assertion that salaries did not pay for needs. Requests were sent to the two hundred forty-seven persons who represented the married members of the faculty. One hundred twenty-one of these refused to participate. Of the 126 who accepted the invitation, thirty could not, for one reason or another, be included in the study. By the beginning of February, 1923, ninety-six complete family schedules were available, a number which represented 50 per cent of the married members of the University of California faculty. Characteristically this group of ninety-six families was made up of men and women in the prime of life and of their descendants under sixteen. Sixty-two per cent of the men of the families were somewhere between 35 and 50 years of age; their wives, slightly younger. The families were typically American, born in the north and west of the United States. On the whole, the households were of the modern "small-family" type. The size of family showed an average of 3.5 persons.

When the facts of income and expenditure obtained by the interviewers were tabulated and interpreted, the assumption that salaries do not meet the scale of wants seemed entirely verified. These ninety-six families showed an average family expenditure of $5,000 per annum and this total was required in despite of budgets which evidence the utmost diligence and care in the use of the family income. Salaries did not supply the $5,000 necessary for this scale of wants. Indeed, in three-fourths of the cases salaries did not pay for the goods and services regarded as necessary. Seventy-five per cent of these ninety-six faculty families supplemented salaries by other earnings. In 47 per cent of the cases, salary was more than three-fourths of the income; 40 per cent reported salary as less than two-thirds of their total income. For all ranks of the faculty members in the group studied, the mean salary was 65 per cent of the total income. Vested income played relatively little part in the income of most of the group. Of the ninety-six families studied, only five cases reported property income that exceeded the income from work. An exceptional case showed salary as only 13 per cent of the total income, returns from property and additional earnings making up the rest. But in the major part of this group of ninety-six families, salary was added to by forms of work other than regular university work which yielded an average return in sums that range from $1,000 to $2,000.

The salary range of this group was $6,000, that is, from $1,400 to $8,000. The

income range was $13,200, from $1,800 to $16,000. Massing is, of course, in the lower income groups. Only one family was trying to live on less than $2,000, only two commanded more than $12,000. The average mean income from all sources proved to be $5,300; the median, $4,800. This is to say that 60 per cent of these ninety-six families had total incomes of less than $5,000. Can a professional standard be maintained on less than this $5,000? Does not this sum represent the minimum cost of health and decency? In general, when statistically examined, the expenditures all showed spending ways it would be difficult to call careless or extravagant, all obviously followed the plan advocated vigorously by all schemes for "wise spending." In these expense histories, the emphasis fell most heavily on what used to be called "the higher life," those items of an important class of expenditures which as yet have no well-established name. For lack of a better term, these items, such as investment, insurance, savings, automobiles, recreation, health, dependents, gifts, education, professional expense, association, church, charity, tobacco, were grouped in this study under the heading "miscellaneous." The thirteen items in this subdivision and the items of house operation are those which give special character to the spending reported by these university families.

The mean cost of living for the whole group of ninety-six families whose average size was 3.5 persons proved to be $5,511.77. For the professors the average expenditure proved to be $7,014.88. The instructors reported an average expenditure of $4,016. On an average, 17 per cent of the income was allotted to food; 9 per cent to clothing; shelter absorbed an average of 17 per cent; house operation, a caption that covers twelve rather important items, took 13 per cent; miscellaneous, with its thirteen sub-items, averaged 43 per cent. As the total amounts expended annually increase, the percentage these families assign to food and clothing regularly decreases in favor of expenditures for some one of the thirteen items of miscellaneous. These families spend an average amount of $900 for food, a sum that passes everywhere just now as the cost of minimum food requirements for those living at a subsistence plus level. The same extreme simplicity plainly dictates clothing expenditures. Two-thirds of the husbands and one-half of the wives spent annually between $100 and $200 each for their personal wardrobes. Thirteen women and eight men reported spending less than $100 each. The maximum spent by either sex, in families with the highest income, was about $500. One of the surprising facts which developed was this: although the simplicity in clothing of the average professor is traditional, in 40 per cent of the families the housewives spent less than their husbands.

One among the outstanding facts which the study developed was the way these ninety-six families consistently aimed to dispense with domestic service or at least to use a minimum of it. The desire to save the costs of domestic service appeared in every family. Fifty-five of the ninety-six families reported owning automobiles. For these fifty-five families, this item took 6 per cent of the total expenditure, 17 per cent of the miscellaneous expenditures. Between $2,000 and $4,000 a trifle over one-third of the families owned cars. At the level of $4,000 to $6,000, 50 per cent had their own cars. Between $6,000 and $10,000, three-fourths had automobiles. With incomes over $10,000 nearly 90 per cent had automobiles. Apparently $6,000 to $7,000 was the income level where professional families felt free to buy automobiles. In nearly two-thirds of the cases it was reported that they were spending less than $500 annually on their cars, but one-third spent more than $1,000. In the group of fifty-five who own cars, 11 per cent reported no expenditure for domestic service, apparently preferring to spend for the combined service and recreation which an automobile represents. For forms of recreation other than automobiles, the average expenditure proved to be about $200.

Of the ninety-six families only two reported no expenditure for sickness. On

the other hand, a few families quoted amounts very high indeed. Five families, two of whom had incomes under $5,000, reported health costs between $1,000 and $2,000. One instructor's family of four persons living on $3,400 was constrained during the year 1921 to 1922 to spend 25 per cent of the total income on this item. However, for two-thirds of the ninety-six families, expenditures for health absorbed less than 6 per cent. For 16 per cent the item took $500 or more. The average physician's bill was $75. Forty families paid specialists amounts that averaged $35. Ninety reported dentist bills whose average was $50. The costs of the services of optometrists averaged $30, paid for by fifty-five families. The thirty-six who reported hospital bills, quoted sums that averaged $62. The twenty-three families who set down a nursing charge showed an average of $45. It was interesting to note that the higher expenditures for dentistry appear in the higher expenditure levels only.

Expenditure to provide against the future takes first place in the general spending of these families. As a whole, investments absorb 26 per cent of miscellaneous and 13 per cent of the total expenditure, more than clothing and very little less than food or shelter. Only four families made no report of expenditure for this item. Of these, two families were buying homes, an item classified as an investment. Life insurance was the most recurrent type of "investment." Sixty families reported savings other than insurance. These appear as bank savings in thirty-six cases and as stocks and bonds and other forms of securities in thirty-eight cases. The reports concerning gifts suggest that a fixed standard controlled expenditure for this item. The expenditure for all levels of income averages about $100 annually, 2 per cent of the total expenditure, 5 per cent of miscellaneous.

The amounts which the academic man himself spent on professional expenses range from 1 per cent to 38 per cent of the total income. Of ninety-six men, twenty-two spent less than one-half of 1 per cent. The average expenditure is $60, or 1.3 per cent. Nearly 80 per cent of the families investigated spent less than $100 on incidentals. Study of this item included the discovery that the average cost of all tonsorial service for man, wife and children was $13. The costs of association dues, that is, affiliations with social clubs, vary slightly from 1 per cent. Expenditure for church and charity proved to be comparatively small. For the fifty-two families out of ninety-six who supported churches the contribution varied from one-tenth of one per cent of the total expenditure to 7.5 per cent. In only two cases was more than 5 per cent of income dedicated to this purpose. One family gave 7 per cent of total expenditure, or $350. For charitable purposes, there was a wide range from one-tenth of 1 per cent to 4 per cent. Only sixty-three of the ninety-six families reported any expenditure for tobacco. The highest and exceptional amount spent constituted 1 per cent of the annual income. The median amount spent was less than one-twentieth of 1 per cent, or about $25 per annum.—J. B. Peixotto: *Science*, 68: 497 (Nov. 23) 1928.

Training of Students in Anesthesia in Great Britain

Training in anesthesia is very thorough and interesting, and students are very proud of their attachment to the anesthetic unit—membership of which is proclaimed to the world by attaching tongue forceps (which are never used) to their coats. In the large London hospitals and training schools most of the work done is what is called in America "clinic work." To each of these hospitals is attached, as is here, a staff of physicians, surgeons and specialists, and all their work done in these hospitals is absolutely free. The students are assigned to work in groups, each group forming a unit—surgical, medical obstetrical units, and so on. Students are eighteen months on different surgical units, and during this time all the anesthetics are given by the students, under the direct supervision of the various members of the anesthetic staff of that unit. Service is in

strict rotations from an alphabetical list hung up in the dressing rooms. As the surgeons of a unit operate at least three afternoons a week, doing four to five major operations each afternoon, each student gives a goodly number of anesthetics during these eighteen months. Lectures are given on the pharmacology, physiology, mode of action and administration of anesthetics. The students never gave an anesthetic except under the direct supervision of the staff. A physician who wishes to specialize in anesthesia when he has taken his degree obtains a post in one of the hospitals as assistant resident and after six months' service is made resident anesthetist. In this way he gains further very useful experience and has as an added advantage the presence of the honorary anesthetists, as we called our staff, to help and advise him in his difficulties. He comes in contact, too, with the surgeons who, when he branches out for himself, will give him their private work to do.—CLAIRE MALONE: *California and Western Medicine*, 29: 331 (Nov.) 1928.

Education in Medical Radiology

The training of teachers in radiology is a very important question. A university teacher in medical radiology should fulfill the same requirements as are made of the teachers in other disciplines; that is, he should be not only a good practician, but should possess a scientific competence proved by independent scientific production, and he should be able to teach. In a large attendance at institutions for radiologic research and instruction lies the only possibility of developing a sufficient staff of teachers in that branch of medical science. Also in the training of teachers an organized cooperation with correlated medical disciplines is absolutely indispensable. A necessary condition for the development of education in medical radiology on a scientific basis is that the radiologic work in the hospitals out in the country be organized to function in an independent and scientific manner. If there is to be any meaning at all in starting and maintaining a system of scientific, special education in medical radiology, there must be established, in connection with those hospitals, radiologic departments of such a character that radiologic work can be carried out there in a scientific manner, offering the radiologist in charge of such a department an economic situation justifying the long years he has spent in thoroughly fitting himself for the work. At present, the roentgen departments of Swedish hospitals offer for roentgenologists twenty-two situations as physicians in chief, and six more such places are in the course of being established.—GOSTA FORSSELL: *Radiology*, 11: 501 (Dec.) 1928.

Education in Medical Radiology in Sweden

Since 1914, the Caroline Medical-Surgical Institute here in Stockholm has organized regular courses in roentgen diagnostics and roentgen technic. The courses were optional for the students. Since 1920, similar courses have been instituted at the Faculty of Medicine of the University of Upsala, and since 1923 at the University of Lund. By a Royal Decree of Nov. 16, 1923, roentgen diagnostics was made a compulsory subject for the medical students in all the Swedish universities, and last year, in 1927, a parliamentary decision made medical radiology a recognized special department of medical education and teaching. Ordinary lectures in medical radiology were established at the universities of Upsala and Lund, while at the Caroline Institute, where a personal professorship had been established in 1916, its holder was raised to the rank of an ordinary professor in medical radiology. All the teachers in radiology are at the same time senior physicians in some radiologic institution, and have at their side assistant physicians appointed by the University, besides the necessary staff of nurses and hospital attendants. It would be contrary to the idea and spirit of the Swedish universities to have the scientific work of an important special department directed by men representing some other

branch of science, and executed by changing assistants without any special training for their task. The teaching of medical radiology is arranged in a manner which gives that branch a character entirely its own within the plan of medical instruction otherwise obtaining in Sweden. As far as other medical subjects are concerned, the university teaching is limited to the general lectures and courses common and compulsory for all the students, while the training in the specialties must be obtained entirely through practical service as assistant physician or amanuensis in clinics and theoretical institutions. Only with regard to medical radiology does the teaching by the university comprise both the compulsory courses common for all the students and voluntary continuation courses combined with practical exercises, and service as medical assistants for practical training. Finally, there exists with regard to radiology, more than with regard to any other branch, a cooperation in the matter of teaching between the institution for radiologic teaching and the other clinical institutions. The compulsory course of instruction is given during the early part of the student's clinical terms, after he has seen service for three or four months in some of the large clinics. Its object is to give all the students a systematic presentation of the subject of roentgen diagnostics; that is, of the science dealing with the anatomic structure of the human body as it appears in the light of the roentgen ray. This course is given in twenty lecture hours during a period of six weeks, and is taken by the student at the time of his clinical service in the medical or surgical department. The number in each class is from thirty to sixty. The instruction is given in the form of lectures, with demonstration of roentgenograms. Examinations do not form a part of this course as yet; but it is desirable that they should be introduced. During the students' four years of service in the clinics they have daily occasion to see the demonstration of roentgen findings by the clinical teachers in connection with the clinical lectures and demonstrations, at the same time as they themselves, during their service as clinical assistants, take part in the daily conferences at the central roentgen institute. The voluntary continuation courses in medical radiology are taken at the end of the student's time of clinical service, shortly before the final examinations; consequently, after from eight to ten years of medical study. Their object is partly to give a presentation of medical radiology as a whole; that is, of the science dealing with the various forms of radiation in the service of medicine; and partly to give some practical training in roentgen diagnosis and roentgen technic. They are intended as a preparatory school for those who wish to devote themselves to radiology or some branch of that science, and also for physicians who may be going to take up service in some minor hospital, to which no special radiologist is attached. The full course occupies about forty-four lecture hours, and extends over two months. It consists partly in laboratory exercises in the interpretation of roentgenograms, partly in lectures—with demonstrations—on specially chosen parts of the roentgent diagnosis and the elements of radiobiology and radiotherapy. The number of attendants of each continuation course is limited to twelve. Simultaneously with the course, the students—divided into groups of three—receive practical instruction in roentgenography and fluoroscopy. For some of them an opportunity is provided to take part, as assistant physicians, in the work at the central roentgen institute of the university.—Gosta Forssell: *Radiology*, 11: 498 (Dec.) 1928.

Utilization of Summer Vacation of Medical Student

For the student whose health and financial condition permit, the long vacation offers an ideal opportunity for study. Freed from the class room, the roll book, assignments, required work, quizzes and student responsibility, he is at liberty to seek, inquire, read and study; that is, to forage for himself in the fields of medicine. He will feel that what he gets will depend entirely on himself. The

exact nature of the study will be determined by his previous experience and, to some extent, by his plans for the future. The sophomore student has not yet acquired the elementary principles of clinical medicine. He has no well formed clinical ideas. He has not learned the fundamentals of medical procedure and thought. Therefore, he should not look to the field of clinical medicine. He would be unable to appreciate the things he met there and, what is more serious, he would be susceptible to the formation of ideas and concepts which are incorrect. He would surely develop the most fatal of all errors of medical habit, that of working backward from a preformed diagnosis to the indications which went to make it. Accordingly, for the sophomore student there is the opportunity for a deeper and more comprehensive study of one of the preclinical subjects with which he is already familiar. The study of medicine is essentially a study of the structure and function of the human body as a whole and of its individual tissues. So, what greater benefit can he attain than to acquire a more intimate knowledge of its structure in the dissecting room or of its function in the physiology laboratory? Should he feel that he is sufficiently well grounded in normal structure and function, let him enter the laboratory of pathology where he may gain a fuller insight into the deviations of tissue structure as wrought by disease. Here he may be safely shown some of the clinical pictures accompanying the pathologic conditions which he sees. With the junior student the situation is different. He has acquired a store of clinical ideas, concepts and principles. He has been taught the proper procedure for clinical study. He is capable of attacking the problem which the patient presents. For him, a hospital clinical clerkship, a student internship if you prefer to call it, offers the greatest opportunity. This should be either in a teaching hospital or in one where suitable supervision will be assured. Outside of the hospital there is the opportunity of an association with a practicing physician. He should be chosen on the basis of the quality of his professional life and his ability as a preceptor.

—R. H. OPPENHEIMER: *Southern M. J.*, 21:722 (Sept.) 1928.

Surgical Education and Surgical Practice in Future

At the meeting of the Section of Surgery of the Royal Society of Medicine, Sir Holburt Waring, the president of the Section, suggested some points in connection with surgical education and practice in the future. Dealing first with the basic sciences—chemistry, physics and biology—in relation to surgical education, he said that since 1923 the medical curriculum had been lengthened by establishing a preregistration examination in chemistry and physics. He was not sure that the change had been entirely advantageous. Chemistry and physics were now in many cases taught to future medical students in schools or colleges badly or inefficiently equipped for the purpose, and there had been many evasions or semi-evasions of the spirit of the General Medical Council's recommendations whereby this change was brought about. It was disadvantageous also because biology had been omitted from the preregistration examination. It would be in the interests of medical education to add biology to this examination, and only to admit to such examination students who had completed courses in these three subjects, either under recognized teachers or in schools or colleges recognized for the purpose. The course in biology should also be modified so as to comprise general biologic problems, and the present extensive "type" method of instruction should be considerably curtailed. If some rearrangement of the kind were made it would be easier for medical schools to carry out the Council's recommendation that the study of the basic sciences should be continued throughout the entire period of the students' curriculum. If this were done the heads of the departments of chemistry, physics and biology could be utilized, first in teaching these subjects as applied to medicine and surgery, and then in many directions in connection with pathology and diagnosis. At the present time it was rare for a biologist to be called on to deal with the

elucidation of a clinical or pathologic problem in a hospital. Methods of surgical education had been modified to a considerable extent during recent years by the increasing tendency in nearly all schools and hospitals to develop specialism. New special departments had been added in most hospitals, with the result that the clinical facilities of a general surgeon had become limited in respect to the forms of surgical diseases admitted to his clinic and so made available for the surgical instruction of students. With regard to professorial units, the advantages which had accrued from the appointment of a whole-time professor of surgery had been chiefly along the lines of increased research on surgical subjects and the reorganization and general improvement of surgical teaching, in the nonprofessorial portions of the institution concerned. The nonprofessorial units usually consisted of from forty to sixty beds, with a personnel of a surgeon, an assistant surgeon or surgeon to outpatients, a registrar, and two resident officers. In the professorial units more laboratory accommodation had been given and a larger personnel, which could be utilized for the purpose of diagnosis, treatment, research and instruction. After pointing out some difficulties, chiefly arising from specialization, Sir Holburt Waring said that he was coming to the conclusion as regards professorial units that these could best be utilized in surgical education by making them the organizing heads of the entire course of instruction on the surgical sides of the schools and hospitals concerned, giving preliminary courses to students before they commence their clinical surgical work proper. They should be utilized also, in organizing and carrying out research, and in the clinical education of students after they had passed through one of the nonprofessorial surgical units. With regard to the nonprofessorial units, the usual custom in most hospitals, especially in London, was for a student to spend six months as a surgical dresser. Instead of, as at present, limiting the student's work to one nonprofessorial unit, it would be wiser to enlarge the units of combining two together. If this were done, and time-tables rearranged, it might be possible to give to every student a much larger and more extensive course in practical surgery. In addition, courses of instruction in the special departments should be strictly limited to the subject-matter of those departments, and a specialist should not be allowed to try to extend his specialty into other parts of the body which might be considered to be connected with it directly or indirectly. Sir Holburt Waring doubted whether the use of cinematograph films in surgical education, except in special cases, presented any great advantages. The best use of the film was in connection with many forms of fractures and dislocations. He was not sure how far the use of animals in the acquisition of technical experience could be justified in the education of the future surgeon. He could, by the use of animals, learn many details of surgical technic, but, on the other hand, conditions were somewhat different.—*British M. J.*, 2:897 (Nov. 17) 1928.

Teaching of Obstetrics

The curricula of our medical schools and of our premedical institutions are literally jammed with irrevelant subjects which have no bearing whatsoever on the practice of medicine. Far too much emphasis is placed on clinical subjects which might better be shifted to graduate schools. Indeed, it would seem that between the theorizing of the Ph.D's of our faculties and the gormandizing of the general surgeons, the obstetrician has done well to maintain a semblance of individuality. Permit me to submit to you the following propositions for your consideration: (1) If it is the business of our undergraduate medical schools to prepare students for the general practice of medicine, it follows that obstetrics should have a large place in the curriculum. (2) In the general practice of medicine obstetrics far exceeds that of general surgery in importance and is only second to that of internal medicine. Such should be the relative positions of these subjects in the curricula of our schools. (3) The demand in numbers of academic hours on our medical

students is already excessive and should be reduced. To provide more time for clinical instruction in obstetrics, without adding to the burden of the student, the didactic teaching in obstetrics, as well as in all clinical subjects, might well be restricted to the fundamentals; much of the teaching in general surgery should be shifted to graduate schools and far less emphasis should be placed on minor specialties. (4) The need is for more practical instruction in obstetrics and this can only be attained in hospitals and dispensaries. The service in the outpatient department, as commonly conducted in our institutions, is no adequate substitute for the dispensary and the hospital. (5) Not less than one month should be devoted exclusively to a maternity service. In this service the student should deliver a minimum of twenty cases, under the direction of trained clinicians; and the importance of prenatal supervision should be stressed. (6) Everywhere throughout the world it is apparent that the teaching of obstetrics is receiving more and more consideration. The medical schools of the United States are lagging far behind most schools of the world in practical instruction and this for lack of adequate clinical facilities and the time to devote to it. There must be a revamping of the entire curricula in our schools to the end that our students may be better prepared to meet the demands of the general practice of medicine. (7) The maternal morbidity and mortality, which in the United States has not decreased in the last fifteen years and is today the highest of the twenty-one leading nations, is chargeable to educational defects and will not be materially reduced until our institutions provide more adequate clinical facilities. (8) From my correspondence I learn that the countries in which part or all of the institutions give obstetrics and gynecology combined, equal recognition with general surgery are Russia, Poland, Ecuador and Argentina; that in Germany, France, Norway, Sweden, Holland, Italy and Switzerland the allotment is nearly equal; while England, Scotland, Wales, Canada, Australia, Egypt, Finland, India, Cuba, Czechoslovakia, Chile, Peru, Brazil, Austria, Hungary, Mexico, China, Siam and Haiti give much more time to surgery than to obstetrics and gynecology, the proportion being about 2 to 1. However, it is of interest to note that in none of these countries is surgery given so large a proportion of the teaching hours as in the United States where the ratio of surgery to obstetrics is in the neighborhood of 4½ to 1. (9) The American Association of Obstetricians, Gynecologists and Abdominal Surgeons respectfully petition and urge on those who are in official command of the situation to remedy this state of affairs. We ask this with no desire to unduly exalt ourselves or our specialty, but for the purpose of preparing our students for the responsibilities of their chosen profession.—PALMER FINDLEY: *Am. J. Obst. & Gynec.*, 16: 622 (Nov.) 1928.

Should Grade Requirements be Higher in Three Major Subjects, Than in Other Courses of So-Called Clinical Years?

In my opinion it would be wise to give each student more freedom in the length of time devoted to the medical course and to each individual subject. This would call for a system of general examinations; to be given at the time of the candidate's application for a degree. Different grade requirements for major and minor subjects would not decrease the number of required hours. It would stress the importance of certain subjects, but would violate one of the basic principles of education and, therefore, should be considered inadvisable. Under our present educational system and licensure requirements, the specialties should be grouped as subdepartments of medicine and surgery, with the scope of instruction under the supervision of the heads of these major departments and with only one examination for each main division. Under this system the less important subjects would not be overemphasized and yet each student would obtain the essentials for practice.—BIGGER, I. A.: *Southern M. J.*, 21: 1056 (Dec.) 1928.

Medical Curriculum

In this article an attempt is made to outline a curriculum to give greater cohesion or "correlation" to the student's work. While attempting to conserve the good things secured in a generation of progress, student, laboratory and patient meet earlier and oftener in the course. The main divisions of the curriculum for the first two years of the medical school will be: (1) Introductory studies, anatomy and bacteriology. (2) Muscular movement and muscles, bones, tendons, joints and skin. (3) The heart, arteries, veins and the circulation. (4) The blood, omitting the biologic aspects. (5) Respiration and the respiratory system. In the second year: (6) Foods, nutrition and digestion. (7) Absorption and metabolism, including growth and old age. (8) Excretion and the organs of excretion. (9) Internal secretions and endocrine organs. (10) Reproduction and embryology. (11) The nervous system and its workings. (12) The special senses. In the third or fourth year: (13) Medical aspects of the mental processes. During the first two years each of these subjects except the mental processes will in turn be taken up in the laboratories and a few appropriate clinical cases presented as focal points for the laboratory studies. In general, work in the several laboratories may be discontinuous and the student will devote his entire time to the various aspects (anatomic, biochemical, et cetera) of one subject before taking up another, a plan which cannot be rigidly followed. At the end of his second year the student will enter on his clinical studies as usual. The curriculum as here outlined covers only two sessions. In the first period of thirteen weeks the student starts on the usual studies in anatomy and dissecting, and takes up bacteriology. The course should be so arranged that histology will largely keep step with gross anatomy as a single teaching course. In December the students will focus particular attention on muscles, motor nerves, tendons, joints, bones and skin. There need be no examinations at the end of the first term. The methods of physical diagnosis will be started and will keep pace with dissections. Roentgen plates will be studied in connection with dissection. The time at present available in our curriculum between September and Christmas is thirteen weeks of thirty-four class hours per week, or 442 hours in class work with deductions for holidays. Of this, bacteriology requires 144 hours, leaving 290 hours for anatomy, gross and microscopic. After Christmas, dissecting and histology continue; physiology and pathology are started. Beginning toward the last of February in the first year and continuing to the end of the second year, the material from current autopsies will be studied during one hour of each week. In summary, the subjects and total time quotas for the first session are: Gross anatomy, 410 hours; histology, 126 hours; bacteriology, 144 hours; physiology, 168 hours; pathology, 168 hours; autopsy reviews, fifteen hours; biochemistry, seventy-seven hours; clinics, fifteen hours; conferences, fifteen hours; total, 1138 hours. According to this outline, during the first year the medical student will complete systematic medical bacteriology, will complete one dissection, will have a rounded knowledge, though lacking in detail and depth, of bones, joints, muscles and tendons, with some of their relationship to skin and nerve, and will just about complete a similar rounded study of the heart and circulation and of the respiration and blood. He had learned to connect roentgen data and the data of physical diagnosis with his studies in anatomy and physiology through elementary practice. For fifteen weeks he has made weekly comparisons between the normal tissues of his anatomic studies and the current autopsy material. For fifteen weeks he has seen and come into contact with patients selected to give point to his immediate laboratory studies. He has also laid a foundation in biochemistry for his second year work. In their second year the students will begin with a symposium treatment of the alimentary tract. The clinics will continue once a week and will also include occasional cases illustrating the subjects covered in the first year. The autopsy reviews will

continue. Immediately following the "alimentary tract," the subject of nutrition and metabolism will be considered by the physiologist, biochemist and pathologist, and clinical examples, especially from the pediatric service, will be included. The second-year students will begin in January with the same kind of study of reproduction, including the histology and embryology, with obstetric aspects of the developing embryo and the physiology of reproduction. Brief attention will be paid to the pathology of the fetus, developmental anomalies, hereditary diseases and congenital tumors. In this series of studies the obstetrician is expected to take an active part in determining the matter to be presented, both in the clinic and in the laboratories. This will be followed by the study of the central nervous system, peripheral and central. For this seven weeks is allowed. The last three weeks of the second year is scheduled for the study of the special senses. In the first term of twelve weeks the schedule will be apportioned as follows: Biochemistry, 133 hours; gross anatomy (alimentary, two hours; excretion, two hours; reproductive, two hours), six hours; histology (alimentary tract, twenty-four hours; kidneys, etc., twenty-four hours; reproductive, nine hours), fifty-seven hours; physiology (alimentary tract, eight hours; kidneys, etc., twenty-five hours; reproductive, eleven hours, nutrition, seven hours), fifty-one hours; pathology (alimentary tract, thirty-two hours; kidneys, etc., twenty-seven hours; reproductive, eighteen hours), seventy-seven hours; autopsies, twelve hours; clinics, twelve hours; conferences, twelve hours; pharmacology, forty hours; total, 400 hours. In the second term, 340 hours, pharmacology and materia medica receive 120 hours, embryology 100, and thirty hours in all go to clinics, conferences and autopsy reviews. The nervous system takes the remainder of this term. (Gross anatomy and histology, seventy-eight hours; physiology, ten hours; pathology, twelve hours.) In the third term the schedule includes: Pharmacology, eighty hours; physical therapy, twenty hours; total, 100 hours. The special senses (gross anatomy, three hours; histology, nine hours; physiology, nine hours; practical aspects by practitioners, nine hours), thirty hours; physical diagnosis, forty hours; preventive medicine, personal and public aspects, 100 hours; total 270 hours. The clinics, which form an important part of this curriculum, should be diversified in arrangement and conduct. At least a few cases presented to the entire class during the first and second years should be prepared for quite carefully by both the clinician and the preclinical department heads. After the clinical presentation, the preclinical teachers should discuss the selected cases and point out the relationships pertaining to their specialties. The cases presented should be referred back with adequate data to each of the preclinical teachers and each of them should make a definite, concrete effort to discuss the cases presented when next he meets his class. Opportunities should be scheduled so that every preclinical teacher may have a period to review the clinical cases. At the end of the second year will come examinations in the laboratory subjects. While it may be appropriate to have detailed examinations for each technical subject, like anatomy, or physiology, there should also be employed a "general examination," either as questions given in the several specialties, or as a separate examination. The "general examination" at the end of the fourth year should also be made part of the scheme here outlined. With regard to teaching, each teacher will have at least as many hours with his students as he has now, and in addition will be able to make special points in the "conferences." The attempt is made in this schedule to provide a basis for coherence in teaching. The chief difficulty in the use of this curriculum will be the practical one of avoiding conflicts of two classes meeting in the same laboratory at the same hour. Preliminary drafts indicate that this matter can be managed, though the difficulty may be greater if the classes are divided into sections.—MARSHALL, HARRY T.: *Southern M. J.*, 21: 989 (Dec.) 1928.

Book Reviews

The Science of Nutrition

By Graham Lusk, Ph. D., Sc. D., professor of physiology at the Cornell University Medical College, New York City. 4th Ed. W. B. Saunders Company, Philadelphia, 1928. Price $7.00.

The first edition of this book appeared more than 20 years ago and each succeeding edition has been received with marked interest by the medical profession. There has never been a time in the history of medicine when the science of dietetics has played as important a rôle as at present. Food and its relation to health and disease is occupying a more commanding position as new chapters in this remarkable science are being written. It behooves the practitioner of medicine to keep himself informed regarding these data. There is not a day in the practice of his profession but what he is called upon to advise regarding diet. Food faddists are common, and for the medical man to pursue a sane course through the maze of conflicting data regarding diet is no easy procedure. A careful perusal of Lusk's book will go far in steering a safe course. The author quotes freely and extensively from the work of other scientists in the field of nutrition. He gives particular credit to Professor Max Rubner of the University of Berlin for his remarkable work during the World War on foodstuffs. The book deals for the most part with the influence of foods on metabolism. Four chapters are devoted to the influence of protein food, one to fats and three to carbohydrate metabolism. Following this discussion a chapter on the normal diet appears. A careful study of this chapter will go far to dispell the teaching of food extremists. "The accessory factors" of diet or "vitamins" are discussed briefly and the author makes no attempt to invade the mass of data available on this subject. This cannot be regarded as a defect as the author himself states that the briefest outline must suffice for a book of this character. The food requirements during the periods of growth and during pregnancy are lucidly discussed. There is also a chapter dealing with metabolism in anaemia and in high altitudes which is of decided interest. A short section deals with the influence of the thyroid, parathyroid and pituitary glands on metabolism and nutrition. The subject of diabetes both experimental and true diabetes mellitus can be read with great profit. Renal glycosuria is also discussed as is metabolism in nephritis, cardiac disease, fever, gout.

Perhaps the only criticism that seems justified is that the author could have summarized his work at the end of each chapter and stated his conclusions with greater clarity. While it is admitted that many of the subjects are still in a controversial state, it is felt that at least the concensus of opinion at the present time, together with the author's personal opinion on mooted points, could have been stated with profit. The author deals with the subject more from the standpoint of the physiologist and laboratory worker than from the standpoint of the general practitioner, and the subject of diet in disease processes receives not as much attention as one might wish. The practical application of much of this data on the science of nutrition is left in a measure to the individual himself.

It is to be hoped that some day a book on nutrition will be forthcoming which represents the combined experience of the trained laboratory worker and the internist whose duty it is to apply these principles at the bedside. It is incumbent on the medical man to keep himself informed regarding the latest advances in our knowledge of foods and nutrition. This book will serve an important function in this respect and can be read with profit by every practitioner of medicine.

Textbook of Pharmacology and Therapeutics

By Hugh Alister McGuigan, Ph. D., M. D., professor of pharmacology, University of Illinois College of Medicine. Illustrated, Philadelphia, W. B. Saunders Company, 1928. Price $6.00.

The purpose of this book is to present in readable form and within reasonable compass as many of the facts and theories of pharmacology as a medical student may be expected to cover in the usual course in this subject. Many students will be grateful for this form of presentation, in which a simple sentence, which the student can seize upon and remember, replaces a complicated statement of conflicting or fragmentary ideas which may leave a rather vague imprint upon his memory. Such a book, of course, should be written with the utmost care. For this reason one may wonder why, for instance, the author should give such generous space to an elaboration of the statement, which many flatly contradict, that pituitrin is a galactagogue "par excellence," while apportioning but seventeen lines to an anesthetic, and an important one, ethylene. On the other hand, there are many commendable features, not the least of which is the consistent use of the metric system; and the chapter on prescription writing contains practically all the information on vehicles, incompatibilities, Latin inflections, abbreviations, and so on, which a student may need in working out ordinary exercises in prescription writing.

A Textbook of Pathology

By W. G. MacCallum, M. D., professor of pathology and bacteriology, Johns Hopkins University. 4th Edition. Philadelphia. W. B. Saunders Company, 1928. Price, $10.00.

Dr. MacCallum's book represents an interesting departure from the traditional textbook of pathology. It is written largely as an attractive series of lectures, with a continuity of theme enriched by examples and wider use of associated material than may be found in a more formal text. This makes for engaging the interest of the student, and for easy reading.

The book, as Dr. MacCallum says, is not intended as a reference book, so the more exhaustive method of treating pathologic changes by systems has not been followed. Collateral reading is encouraged and, by the references appended, attention is directed to more comprehensive treatments of given subjects.

The alterations found in this 1928 edition present an excellent review of advances made in the last few years by dint of an exceeding great magnitude of medical writings. Outstanding additions are found in the treatment of the following subjects; carbohydrate metabolism with the associated development of insulin; the specific principle of the parathyroid, and its relation to calcium metabolism; the anemias; scarlet fever, especially as to the problems of etiology and immunity; and the thyroid, with its anatomical and functional changes.

Much is added to our conceptions of other disorders of internal secretion, as related to the adrenal and pituitary glands. The material on specific dietary principles is added to, and a separate chapter devoted to this and the dietary deficiency disorders. The development of nephritis shows the marked change of present ideas from the older somewhat autocratic nomenclature and sharply defined types of nephritis. In considering the contributory causes of tumor growth credit is given to recent suggestions, and a proper rebuke administered to those mystical writings which rather confuse than advance our conceptions of the etiology of tumor growth. Tumors derived from the nervous system are named in accordance with the nomenclature used by Cushing and his coworkers.

Much care has been expended also in rewriting or rearranging many sections to which only minor additions have been made, such as tuberculosis, bronchopneumonia, endocarditis, streptococcus infection of the lungs and endocardium, syphilis of the circulatory system, aneurysms, pathogenesis and etiology of arteriosclerosis, intestinal obstruction, and the theories of blood clotting.

But few things have been deleted from the former edition. The chapters on the pathology of the conduction bundles of the heart, and the maintenance of acid-base equilibrium of the body are not included. The material on immunity has been condensed. Metaplasia is dismissed with scant consideration, and perithelioma, discredited in the former edition, is omitted entirely from this one.

The index is comprehensive and accurate. Illustrations are from drawings or photographs of well-selected material, but the same objection may be advanced as against other American texts, that the specimens pictured lose much by lack of differential coloring.

An Introduction to Experimental Pharmacology

By Torald Sollmann, M. D., professor of pharmacology and materia medica at Western Reserve University, and Paul J. Hanzlik, M. D., professor of pharmacology at Stanford University. Cloth. Price, $4.25 net. Pp. 321, with 39 illustrations. Philadelphia. W. B. Saunders Company, 1928.

This highly commendable book is primarily intended for the use of the student in his laboratory work in pharmacology but will also be found a veritable mine of information and inspiration to teachers and research workers. It should be very useful also as a reference work for courses in which briefer manuals, perhaps more convenient for use on the work table of the student, are supplied, since it contains not merely the directions, but also thorough discussions of the experiments. The appendices are especially valuable. In addition to specific information regarding the arrangements and materials necessary to the experiments and demonstrations described, there are detailed summaries of methods of anesthesia, directions for the preparation of isotonic and physiological solutions, and an extensive list of drugs with dosages for the production of particular effects in particular animals. All statements of special interest are accompanied, as in Sollmann's large Manual, by references to the literature; the importance of this will be appreciated by the experienced worker in this field.

Essentials of Prescription Writing

By Cary Eggleston, M. D. Fourth Edition, W. B. Saunders Company, Philadelphia, 1928. Price $1.50.

This book is intended to give the student a brief and sequentially arranged treatment of the subject of prescription writing. It is apparently not intended to take the place of somewhat similar booklets which contain in much more compact and convenient form the information, such as measures, rules, and Latin terms, needed in ordinary prescription writing; the nature of the treatment is not compatible with handiness for reference, and there is no table of dosages. Students and teachers will be grateful for its emphasis on the metric system. It is to be hoped that the time will soon be ripe for a complete omission, in future editions, of the complicated directions for the use of the apothecary system. There are, besides a highly commendable chapter on common vehicles, chapters on modes of administration and on the use of official preparations, an index, and a set of questions to be used as exercises.

Preventive Medicine

By Mark F. Boyd, M. D., M. S., C. P. H. Third edition. Cloth. Price, $4.50 net. Pp. 475, with 151 illustrations. Philadelphia. W. B. Saunders Company, 1928.

This epitome of preventive medicine, concisely written and replete with fact, and untrammeled with theory and speculation, is an excellent guide for the medical student as well as a convenient and dependable volume for quick reference to the general practitioner and health official. A brief put pertinent bibliography at the end of each chapter, containing significant recent literature, provides a readily accessible source for collateral reading. The field of preventive medicine is well covered.

The terminology employed in those sections relating to specific, disease-producing bacteria is not free from criticism. Thus, the organism inciting the disease Malta Fever is referred to on p. 219 as *Alcaligines (Bacterium) melitensis* and on p. 281 as *Brucella melitensis*, variety *abortus*.

The illustrations are, on the whole, well chosen, but not well reproduced in every instance. Thus, the figures on pp. 64,280 and 483 are illustrative of three types of imperfection which might be advantageously improved in a subsequent edition.

These minor details, however, do not seriously impair the value of an otherwise excellent and timely volume.

Elements of Physiology for Students of Medicine and Advanced Biology

By E. G. Martin and F. W. Weymouth. Illustrated with 133 engravings, pp. 784. Lea and Febiger, Philadelphia, 1928.

This text presents the subject matter of the science of physiology in a philosophical, systematic, clear and interesting manner. The treatment of the general physiology of protoplasm and the cell as interpreted by physico-chemical laws is excellent and will be easily read and understood by the student of medicine and advanced biology. The authors have accomplished their aim "to present concisely and clearly those elementary facts and principles of physiology which every qualified student of the subject should have at command." Some data important to the student of medicine are omitted, which makes the book less valuable to students and practitioners of medicine than to students of advanced biology.

The book contains reference to special monographs and is well indexed.

Index of Differential Diagnosis of Main Symptoms (Medical and Surgical)

Edited by Herbert French, C.B.E., M.A., M.D., F.R.C.P. (Lond.), with the collaboration of Sir E. Farquhar Buzzard and many others. 4th Ed., William Wood and Company, New York, 1928.

The new revised and enlarged edition is a magnificent work of 1184 pages, with 701 illustrations, 179 being colored, and a marvelous general index, consisting of 90,000 entries. The body of the book deals alphabetically with symptoms, the index lists them under the various diseases, thus being an essential part of the book.

This book will prove especially valuable to undergraduate students who are on their clinical clerkship. There is no more practical and effective way of studying symptoms than by comparison, and for that purpose this work is a veritable encyclopedia. While not taking the place of current literature, which is supplied by the college library, it saves much time ordinarily spent, laboriously, and with questionable benefit, reading textbooks. And, after all, differential diagnosis is the crux of every case studied. It leads to adequate understanding of symptoms and their interpretation. In fact, every medical student will find it well worth while to have this book at his elbow, even though the cost is rather high.